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National Emission Standards for Hazardous Air Pollutants A Compilation as of August 1, 1982

PEDCo-Environmental, Inc.
Cincinnati, OH

Prepared for

Environmental Protection Agency
Washington, DC

Aug 82

U.S. Department of Commerce
National Technical Information Service
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Office of Air, Noise and Radiation
Washington DC 20460
Research Triangle Park NC 27711

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Stationary Source Compliance Series

National Emission Standards for Hazardous Air Pollutants

A Compilation as of August 1, 1982

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16. ABSTRACT

Since their inception in 1971, the National Emission Standards for Hazardous Air Pollutants (NESHAP's) have been expanded or revised 69 times with an additional 13 changes proposed. This document is a compilation of all Federal Register activity related to the NESHAP's since 1971 and supercedes all previous compilations.

Section I is an introduction to the standards, explaining their purpose and interpreting the working concepts which have developed through their implementation. Section II contains a "quick-look" summary of each standard, including the dates of proposal, promulgation, and any subsequent revisions. Section III is the complete standards with all amendments incorporated into the material. Section IV contains the full text of all revisions, including the preamble which explains the rationale behind each revision. Section V is all proposed amendments to the standards.

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by

PEDCo Environmental, Inc.
11499 Chester Road
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Contract No. 68-01-6310

EPA Project Officer: Kirk Foster

Prepared For

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air, Noise and Radiation
Stationary Source Compliance Division
Washington, D.C. 20460

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The Stationary Source Compliance series of reports is issued by the Office of Air, Noise, and Radiation, U.S. Environmental Protection Agency, to assist the Regional Offices in activities related to compliance with implementation plans, new source emission standards, and hazardous emission standards to be developed under the Clean Air Act. Copies of Stationary Source Compliance Reports are available - as supplies permit - from the U.S. Environmental Protection Agency, Office of Administration, General Services Division, MD-35, Research Triangle Park, North Carolina 27711, or may be obtained, for a nominal cost, from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22151.

PREFACE

This document is a compilation of the National Emission Standards for Hazardous Air Pollutants promulgated under Section 112 of the Clean Air Act, represented in full as amended. The information contained herein supersedes all previous compilations published by the U.S. Environmental Protection Agency.

The format of this document permits easy and convenient replacement of material as new standards are proposed and promulgated or existing standards are revised. Section I, an introduction to the standards, explains their purpose and interprets the working concepts that have developed through their implementation. Section II contains a "quick-look" summary of each standard, including the dates of proposal, promulgation, and any subsequent revisions. Section III is the complete standards with all amendments incorporated into the material. Section IV contains the full text of all revisions, including the preamble which explains the rationale behind each revision. Section V is all proposed amendments to the standards. To facilitate the addition of future materials, the punched, loose-leaf format was selected. This approach permits the document to be placed in a three-ring binder or to be secured by rings, rivets, or other fasteners; future revisions can then be easily inserted.

Future supplements to National Emission Standards for Hazardous Air Pollutants - A Compilation will be issued on an as-needed basis by the Stationary Source Compliance Division. Comments and suggestions regarding this document should be directed to: Standards Handbooks, Stationary Source Compliance Division (EN-341), U.S. Environmental Protection Agency, Washington, D.C. 20460.

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I. INTRODUCTION

The 1970 Amendments of the Clean Air Act are considered a landmark in the nation's efforts to control air pollution. They established the authority to control pollutants on the basis of their effects, sources, and best means of control. Section 112 of that legislation provided for establishment of National Emission Standards for Hazardous Air Pollutants, commonly referred to as NESHAPs. This manual is a compilation of those emission standards.

A hazardous air pollutant is defined as "... an air pollutant to which no ambient air quality standard is applicable and which in the judgment of the Administrator causes, or contributes to, air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness". Thus, the Administrator must prescribe a NESHAP for each hazardous pollutant at a level judged to provide an ample margin of safety to protect the public health. The regulation may take the form of an emission standard or a design, equipment, work practice, or operational standard if an emission standard is not feasible. The determination that a pollutant is hazardous precedes public hearings and can be reversed only if hearing introduce contrary evidence. Acquisition of the necessary health effects data to support the establishment of a hazardous pollutant standard is difficult and time-consuming. However, this expenditure of time and effort is necessary because the NESHAPs are unique in that they apply to both new and existing sources. All new sources are subject to control immediately upon promulgation of a standard and all existing sources are to be in compliance within 90 days of promulgation unless granted an extension. Furthermore, although costs migh be considered when determining what constitues an "ample margin of safety", such considerations are not explicitly required by Section 112.

Section 112 of the Clean Air Act defines three steps to be followed in the establishment of emission standards for hazardous pollutants. The first requirement is that the Administrator publish a list of those air pollutants for which he intends to establish emission standards. There were eleven toxic substances appraised as candidates for the first list of hazardous air pollutants: asbestos, arsenic, beryllium, cadmium, chromium, lead, mercury, nickel, polychlorinated biphenyls, polycyclic organic matter, and vanadium. Major selection criteria included (1) the severity of the associated human diseases, (2) the length of time between exposure and disease, with the longer periods considered especially dangerous, (3) the portion of the total human intake relatable to air-borne substances, and (4) the linkage between sources of emissions and reported cases of diseases attributed to the pollutant. Consultations were held with federal agencies, advisory committees, and other experts. All consulted groups recommended that the initial list be limited to asbestos, beryllium, and mercury. In addition, a National Academy of Sciences study concluded that control of asbestos be undertaken as quickly as possible, and the HEW report, "Hazards of Mercury", concluded that it was urgent to use all possible means to reduce exposure to mercury immediately. Thus, an initial list containing asbestos, beryllium, and mercury was published in the Federal Register on March 31, 1971.

The second step in establishing standards requires that, within 180 days after an air pollutant is included on a published list, the Administrator publish proposed regulations establishing emission standards for that pollutant together with a notice of a public hearing, to be held within thirty days. Pursuant to this requirement, proposed regulations for the control of emissions of asbestos, beryllium, and mercury were published in the Federal Register on December 7, 1971.

Following the required waiting periods and public hearings, the final step, promulgation, took place on April 6, 1973. Clarifying regulations were promulgated May 3, 1974. Since then the NESHAPs have undergone several revisions, including the addition of regulations for vinyl chloride from facilities that manufacture both vinyl chloride monomer and polyvinyl chloride and the addition of benzene to the list of hazardous pollutants. In addition, investigations are underway for several pollutants to determine the optimum control option for each.

This document contains all regulations promulgated under Section 112 of the Clean Air Act, represented in full as amended. As more pollutants are investigated and new technology developed, the National Emission Standards for Hazardous Air Pollutants will continue to be updated to achieve their primary purpose of protecting the public health.

SECTION II

SUMMARY OF STANDARDS AND REVISIONS

II. SUMMARY OF STANDARDS AND REVISIONS

In order to make the information in this document more readily available, a table has been prepared which summarizes the National Emission Standards for Hazardous Air Pollutants since their inception in April 1973.

Although regulatory language is necessary to make the intent of the regulation clear, it is difficult for anyone not familiar with these terms to locate concise information. It is with this thought in mind that the following table was developed. It includes the pollutant regulated, the facilities which will be affected by the regulation, the emission standard for these facilities, and if there are sampling or monitoring requirements.

Since the NESHAP's affect both new and existing sources, all regulations become effective the day of promulgation. To cite such promulgation, refer to the volume and page of the Federal Register in which the rule appeared, i.e. 36 FR 23239, meaning volume 36, page 23239 of the Federal Register. The table gives such references for the proposal, promulgation, and subsequent revisions of the NESHAP's. The full text of all revisions and proposed revisions can be located in Sections IV and V.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Pollutant	Affected facilities	Emission standard	Sampling or monitoring requirement
Subpart B - ASBESTOS			
	Asbestos mills	No visible emissions, or meet equipment specifications	No requirement
Proposed 12/7/71 (36 FR 23239)	Roadway surfacing	Contain no asbestos except for temporary use on area of asbestos ore deposits	No requirement
Promulgated 4/6/73 (38 FR 8826)	Manufacturing of products containing asbestos (textiles; cement; fire-proofing and insulating materials; friction products; paper; millboard, felt; floor tiles; paints, coatings, caulks, adhesives, sealants; plastic and rubber materials; chlorine; shotgun shells; asphaltic concrete)	No visible emissions, or meet equipment specifications	No requirement
Revised 5/3/74 (39 FR 15398) 10/14/75 (40 FR 48299) 3/2/77 (42 FR 12127) 8/17/77 (42 FR 41424) 3/3/78 (43 FR 8800) 6/19/78 (43 FR 26372)	Demolition and renovation >80 m pipe, covered or coated >15 m^2 duct, boiler, tank, reactor, turbine, furnance, or structural member, covered or coated	No emissions to outside air; Friable materials removed, wetted, or particles mechanically collected	No requirement
	Spraying friable asbestos		No requirement
	1) Materials applied to equipment or machinery with >1% asbestos on dry weight basis	No visible emissions, or meet equipment specifications	
	2) Materials sprayed on buildings, structures pipes, conduits	Materials must contain <1% asbestos on dry weight basis	No requirement
	Fabricating (cement building products; friction products; cement or silicate board for ventilation hoods; ovens; electrical panels; lab furniture; marine construction; flow controls for molten metal industry	No visible emissions, or meet equipment specifications	No requirement
	Friable insulating materials	Contain no asbestos	No requirement
	Waste disposal	No visible emissions Deposit at acceptable disposal sites	No requirement
	Waste disposal sites	Design and work practice requirements No visible emissions	No requirement

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (Continued)

Pollutant	Affected facilities	Emission standard	Sampling or monitoring requirement
Subpart C - BERYLLIUM Proposed 12/7/71 (36 FR 23239) Promulgated 4/6/73 (38 FR 8826) Revised 8/17/77 (42 FR 41424) 3/3/78 (43 FR 8800)	Extraction plants Ceramic plants Foundries Incinerators Propellant plants Machine shops (which process alloy containing >5% beryllium)	1) 10g/24 hr. or 2) Ambient concentration in the vicinity of the stationary source of 0.01 μg/m^3, averaged over 30 day period	1) Source test 2) 3 years continuous monitoring data
Subpart D - BERRYLLIUM ROCKET MOTOR FITING Proposed 12/7/71 (36 FR 23239) Promulgated 4/6/73 (38 FR 8826) Revised 8/17/77 (42 FR 41424) 3/3/78 (43 FR 8800)	Rocket motor test sites Closed tank collection of combustion products	75 μg/min scm of air within 10 to 60 min. accumulated during 2 consecutive weeks, in area which could adversely affect public health 2 g/hr, 10 g/day	Ambient concentrations measured during and after firing or propellant disposal Continuous sampling during release
Subpart E - MERCURY Proposed 12/7/71 (36 FR 23239) Promulgated 4/6/73 (38 FR 8826) Revised 10/14/75 (40 FR 48299) 8/17/77 (42 FR 41424) 3/3/78 (43 FR 8800) 6/8/82 (47 FR 24703)	Ore processing Chlor-alkali manufacture Sludge dryers or incinerators	2300 g/24 hr 3200 g/24 hr	Source test Source test or sludge test (Sources exceeding 1600 g/day must monitor once per year)

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (Continued)

Pollutant	Affected facilities	Emission standard	Sampling or monitoring requirement
Subpart F - VINYL CHLORIDE			
Proposed 12/24/75 (40 FR 59532)	Ethylene dichloride manufacture	1) Ethylene dichloride purification: 10 ppm* 2) Oxychlorination reactor: 0.2 g/kg (0.0002 lb/lb) of the 100% ethylene dichloride product	Source test Continuous monitor Source test Continuous monitor
Promulgated 10/21/76 (41 FR 46560)	Vinyl chloride manufacture	10 ppm*	Source test Continuous monitor
Revised 12/3/76 (41 FR 53017) 6/7/77 (42 FR 29005) 8/17/77 (42 FR 41424) 3/3/78 (43 FR 8800)	Polyvinyl chloride manufacture		
	Reactor; stripper; mixing, weighing and holding containers; monomer recovery system	10 ppm*	Source test Continuous monitor
Proposed revisions 6/2/77 (42 FR 28154)	Reactor opening loss	0.02 g vinyl chloride/kg (0.00002 lb vinyl chloride/lb)	Source test Continuous monitor
	Reactor manual vent	No emissions	
	Sources following stripper	For each calendar day: 1) Using stripping technology - 2000 ppm for polyvinyl chloride dispersion resins (excluding latex) 400 ppm each for other polyvinyl chloride resins (including latex) 2) Other than stripping technology - 2 g/kg (0.002 lb/lb) product for dispersion polyvinyl chloride resins (excluding latex) 0.4 g/kg (0.0004 lb/lb) product for other polyvinyl chloride resins (including latex)	Source test Source test
	Ethylene dichloride, vinyl chloride and/or polyvinyl chloride manufacture		
	Relief valve discharge	No discharge	Equipment
	Loading and unloading lines	0.0038 m^3 after each loading or unloading, or 10 ppm when contained by a control system	Source test Continuous monitor

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (Continued)

Pollutant	Affected facilities	Emission standard	Sampling or monitoring requirement
	Slip gauges	10 ppm from the required control system	Source test Continuous monitor
	Pump; compresser and agitator seal	10 ppm from the required control system with seals	Source test Continuous monitor
	Leakage from relief valves	Rupture disk must be installed	Equipment
	Manual venting of gases	10 ppm from a required control system	Source test Continuous monitor
	Opening of equipment	10 ppm from a required control system*	Source test Continuous monitor
	Samples (at least 10 percent by weight vinyl chloride)	Returned to system	
	Leak detection and elimination	Implementation of an approved program	Approved testing program
	Inprocess wastewater	10 ppm before discharge	Source test Continuous monitor
		* Before opening any equipment for any reason, the quantity of vinyl chloride is to be reduced so that the equipment contains no more than 2.0 percent by volume vinyl chloride or 0.0950 m^3 (25 gal) of vinyl chloride, whichever is larger, at standard temperature and pressure.	

SECTION III

NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS

Title 40—Protection of Environment

CHAPTER 1—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS [1]

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Method 101A. Determination of Particulate and Gaseous Mercury Emissions From Sewage Sludge Incinerators[66]

Method 102. Determination of Particulate and Gaseous Mercury Emissions From Chlor-Alkali Plants—Hydrogen Streams[66]

Method 103—Beryllium screening method.
Method 104—Reference method for determination of beryllium emissions from stationary sources.
Method 105—Method for determination of mercury in wastewater treatment plant sewage sludges.[7]
Method 106—Determination of vinyl chloride from stationary sources.[28]
Method 107—Determination of vinyl chloride of inprocess wastewater samples, and vinyl chloride content of polyvinyl chloride resin, slurry, wet cake, and latex samples.[28]

Authority: Sec. 112, 301(a) of the Clean Air Act as amended [42 U.S.C. 7412, 7601(a)], unless otherwise noted.[28,40,47]

Subpart A—General Provisions

§ 61.01 Applicability.

The provisions of this part apply to the owner or operator of any stationary source for which a standard is prescribed under this part.

§ 61.02 Definitions.[52]

The terms used in this part are defined in the Act or in this section as follows:

"Act" means the Clean Air Act (42 U.S.C. 1857 et seq.).

"Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

"Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for his determination of compliance.

"Commenced" means, with respect to the definition of "new source" in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

"Compliance schedule" means the date or dates by which a source or category of sources is required to comply with the standards of this part and with any steps toward such compliance which are set forth in a waiver of compliance under § 61.11.

"Construction" means fabrication, erection, or installation of an affected facility.

"Effective date" is the date of promulgation in the **Federal Register** of an applicable standard or other regulation under this part.

"Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

"Existing source" means any stationary source which is not a new source.

"Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that:

(a) Routine maintenance, repair, and replacement shall not be considered physical changes, and

(b) The following shall not be considered a change in the method of operation:

(1) An increase in the production rate, if such increase does not exceed the operating design capacity of the stationary source;

(2) An increase in hours of operation.

"New source" means any stationary source, the construction or modification of which is commenced after the publication in the **Federal Register** of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

"Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

"Reference method" means any method of sampling and analyzing for an air pollutant, as described in Appendix B to this part.

"Standard" means a national emission standard for a hazardous air pollutant proposed or promulgated under this part.

"Startup" means the setting in operation of a stationary source for any purpose.

"Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator.

(Sec. 112, 301(a), Clean Air Act as amended (42 U.S.C. 7412 and 7601(a)))

§ 61.03 Units and abbreviations.[42]

Used in this part are abbreviations and symbols of units of measure. These are defined as follows:

(a) System International (SI) units of measure:

A = ampere
g = gram
Hz = hertz
J = joule
K = degree Kelvin
kg = kilogram
m = meter
m^3 = cubic meter
mg = milligram = 10^{-3} gram
mm = millimeter = 10^{-3} meter
Mg = megagram = 10^{6} gram
mol = mole
N = newton
ng = nanogram = 10^{-9} gram
nm = nanometer = 10^{-9} meter
Pa = pascal
s = second
V = volt
W = watt
Ω = omh
μg = microgram = 10^{-6} gram

(b) Other units of measure:

°C = degree Celsius (centigrade)
cfm = cubic feet per minute
cc = cubic centimeter
d = day
°F = degree Fahrenheit
ft^2 = square feet
ft^3 = cubic feet
gal = gallon
in = inch
in Hg = inches of mercury
in H_2O = inches of water
l = liter
lb = pound
lpm = liter per minute
min = minute
ml = milliliter = 10^{-3} liter
oz = ounces
psig = pounds per square inch gage
°R = degree Rankine
μl = microliter = 10^{-6} liter
v/v = volume per volume
yd^2 = square yards
yr = year

(c) Chemical nomenclature:

Be = beryllium
Hg = mercury
H_2O = water

(d) Miscellaneous:

act = actual
avg = average
I.D. = inside diameter
M = molar
N = normal
O.D. = outside diameter
% = percent
std = standard

(Sections 112 and 301(a) of the Clean Air Act, as amended [42 U.S.C. 1857c-7 1857g(a)].)

§ 61.04 Address.[4]

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate Regional Office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, New Hampshire, Massachusetts, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Massachusetts 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pennsylvania 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Georgia 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 230 South Dearborn Street, Chicago, Illinois 60604.[3,37]

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson Street, Dallas, Texas 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 324 East 11th Street, Kansas City, Missouri 64106.[57]

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 196 Lincoln Towers, 1860 Lincoln Street, Denver, Colorado 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, California 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Washington 98101.

(b) Section 112(d) directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce the national emission standards for hazardous air pollutants for stationary sources located in such State. All information required to be submitted to EPA under paragraph (a) of this section, must also be submitted to the appropriate State Agency of any State to which this authority has been delegated (provided, that each specific delegation may exempt sources from a certain federal or State reporting requirement). The appropriate mailing address for those States whose delegation request has been approved is as follows:

(A) [Reserved]

(B) State of Alabama, Air Pollution Control Division, Air Pollution Control Commission, 645 S. McDonough Street, Montgomery, Alabama 36104.[23]

(C) [Reserved]

(D) Arizona. [30, 48, 67]

Maricopa County Department of Health Services, Bureau of Air Pollution Control, 1825 East Roosevelt Street, Phoenix, Ariz. 85006.

Pima County Health Department, Air Quality Control District, 151 West Congress, Tucson, Ariz. 85701.

(E) State of Arkansas, Program Administrator, Air and Hazardous Materials Division, Arkansas Department of Pollution Control and Ecology, 8001 National Drive, Little Rock, Arkansas 72209 (with the exception of (1)(d) Demolition and Renovation of Buildings Containing Asbestos).*[59,65]

(F) California. [5, 6, 18, 20, 21, 24, 29, 31, 48, 58, 68]

Bay Area Air Pollution Control District, 939 Ellis Street, San Francisco, Calif. 94109.

Del Norte County Air Pollution Control District, 909 Highway 101 North, Crescent City, CA 95531

Fresno County Air Pollution Control District, P.O. Box 11867, 1246 L Street, Fresno, CA 93721

Humboldt County Air Pollution Control District, 5600 South Broadway, Eureka, Calif. 95501.

Kern County Air Pollution Control District, 1700 Flower Street (P.O. Box 997), Bakersfield, Calif. 93302.

Madera County Air Pollution Control District, 135 West Yosemite Avenue, Madera, Calif. 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, Calif. 94582.

Monterey Bay Unified Air Pollution Control District, 1270 Natividad Road, Room 105, Salinas, CA 93906

Northern Sonoma County Air Pollution Control District, 134 "A" Avenue, Auburn, CA 95448

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, Calif. 95827.

San Diego County Air Pollution Control District, 9150 Chesapeake Drive, San Diego, Calif. 92123.

San Joaquin County Air Pollution Control District, 1601 East Hazelton Street (P.O. Box 2009), Stockton, Calif. 95201.

Santa Barbara County Air Pollution Control District, 300 North San Antonio Road, Santa Barbara, CA 93110

Shasta County Air Pollution Control District, 2650 Hospital Lane, Redding, CA 96001

South Coast Air Quality Management District, 9150 Flair Drive, El Monte, CA 91731

Stanislaus County Air Pollution Control District, 1030 Scenic Drive, Modesto, CA 95350

Trinity County Air Pollution Control District, P.O. Box AK, Weaverville, CA 96093

Ventura County Air Pollution Control District, 800 South Victoria Avenue, Ventura, CA 93009

Amador County Air Pollution Control District, P.O. Box 430, 810 Court Street, Jackson, CA 95642

Butte County Air Pollution Control District, P.O. Box 1229, 316 Nelson Avenue, Oroville, CA 95965

Calaveras County Air Pollution Control District, Government Center, El Dorado Road, San Andreas, CA 95249

Colusa County Air Pollution Control District, 751 Fremont Street, Colusa, CA 95952

El Dorado Air Pollution Control District, 330 Fair Lane, Placerville, CA 95667

Glenn County Air Pollution Control District, P.O. Box 351, 720 North Colusa Street, Willows, CA 95988

Great Basin Unified Air Pollution Control District, 863 North Main Street, Suite 213, Bishop, CA 93514

Imperial County Air Pollution Control District, County Services Building, 939 West Main Street, El Centro, CA 92243

Kings County Air Pollution Control District, 330 Campus Drive, Hanford, CA 93230

Lake County Air Pollution Control District, 255 North Forbes Street, Lakeport, CA 95453

Lassen County Air Pollution Control District, 175 Russell Avenue, Susanville, CA 96130

Mariposa County Air Pollution Control District, Box 5, Mariposa, CA 95338

Merced County Air Pollution Control District, P.O. Box 471, 240 East 15th Street, Merced, CA 95340

Modoc County Air Pollution Control District, 202 West 4th Street, Alturas, CA 96101

Nevada County Air Pollution Control District, H.E.W. Complex, Nevada City, CA 95959

Placer County Air Pollution Control District, 11491 "B" Avenue, Auburn, CA 95603

Plumas County Air Pollution Control District, P.O. Box 480, Quincy, CA 95971

San Bernardino County Air Pollution Control District, 15579-8th, Victorville, CA 92392

San Luis Obispo County Air Pollution Control District, P.O. Box 637, San Luis Obispo, CA 93406

Sierra County Air Pollution Control District, P.O. Box 286, Downieville, CA 95936

Siskiyou County Air Pollution Control District, 525 South Foothill Drive, Yreka, CA 96097

Sutter County Air Pollution Control District, Sutter County Office Building, 142 Garden Highway, Yuba City, CA 95991

Tehama County Air Pollution Control District, P.O. Box 38, 1760 Walnut Street, Red Bluff, CA 96080

Tulare County Air Pollution Control District, County Civic Center, Visalia, CA 93277

Tuolumne County Air Pollution Control District, 9 North Washington Street, Sonora, CA 95370

Yolo-Solano Air Pollution Control District, P.O. Box 1006, 323 First Street, #5, Woodland, CA 95695

(G) State of Colorado, Colorado Air Pollution Control Division, 4210 East 11th Avenue, Denver, Colorado 80220.[9]

(H) State of Connecticut, Department of Environmental Protection, State Office Building, Hartford, Connecticut 06115.[16]

(I) State of Delaware (for asbestos, beryllium, mercury and vinyl chloride):

Delaware Department of Natural Resources and Environmental Control, Tatnall Building, P.O. Box 1401, Dover, Delaware 19901[46,63]

(J)-(K) [reserved]

(L) State of Georgia, Environmental Protection Division, Department of Natural Resources, 270 Washington Street, S.W., Atlanta, Georgia 30334.[19]

(M)-(O) [Reserved]

(P) State of Indiana, Indiana Air Pollution Control Board, 1330 West Michigan Street, Indianapolis, Indiana 46206.[36]

(Q) Iowa Department of Environmental Quality, Henry A. Wallace Building, 900 East Grand, Des Moines, Iowa 50316.[60]

(R) [Reserved]

(S) Division of Air Pollution Control, Department for Natural Resources and Environmental Protection, U.S. 127, Frankfort, Ky. 40601.[45]

(T) [reserved].

(U) State of Maine, Department of Environmental Protection, State House, Augusta, Maine 04330.[11]

(V) State of Maryland, Bureau of Air Quality and Noise Control, Maryland State Department of Health and Mental Hygiene, 201 West Preston Street, Baltimore, Maryland 21201.[54]

(W) Massachusetts Department of Environmental Quality Engineering, Division of Air Quality Control, 600 Washington Street, Boston, Massachusetts 02111.[17]

(X) State of Michigan, Air Pollution Control Division, Michigan Department of Natural Resources, Stevens T. Mason Building, 8th Floor, Lansing, Michigan 48926.[12]

(Y) Minnesota Pollution Control Agency, Division of Air Quality, 1935 West County Road B-2, Roseville, Minn. 55113.[44]

(Z) Bureau of Pollution Control, Department of Natural Resources, P.O. Box 10385, Jackson, Mississippi 39209.[61]

(AA) Missouri Department of Natural Resources, Post Office Box 1368,[55] Jefferson City, Missouri 65101.

(BB) State of Montana, Department of Health and Environmental Sciences, Cogswell Building, Helena, Mont. 59601.[41]

(CC) State of Nebraska, Nebraska Department of Environmental Control, P.O. Box 94877, State House Station, Lincoln, Nebraska 68509.[57]

(DD) Nevada. [48,69]

Clark County, County District Health Department, Air Pollution Control Division, 625 Shadow Lane, Las Vegas, Nev. 89106.

Washoe County District Health Department, Division of Environmental Protection, 10 Kirman Avenue, Reno, Nev. 89502.

(EE) New Hampshire Air Pollution Control Agency, Department of Health and Welfare, State Laboratory Building, Hazen Drive, Concord, New Hampshire 03301.[17]

(FF)—State of New Jersey: New Jersey Department of Environmental Protection, John Fitch Plaza, P.O. Box 2807, Trenton, New Jersey 08625.[39]

(GG) [Reserved]

(HH) New York: New York State Department of Environmental Conservation, 50 Wolf Road, Albany, New York 12233, attention: Division of Air Resources.[8]

(II) North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, North Carolina 27611. Attention: Air Quality Section.[32]

(JJ) State of North Dakota, State Department of Health, State Capitol, Bismarck, North Dakota 58501.[27]

(kk) Ohio

Montgomery County: Regional Air Pollution Control Agency, Montgomery County Combined General Health District, 451 West Third Street, Dayton, Ohio 45402.

Clarke, Darke, Greene, Miami and Preble Counties [except for all information required under § 61.22 (d) and (e)]: Montgomery County Combined General Health District, 451 West Third Street, Dayton, Ohio 45402.[53]

(LL) State of Oklahoma, Oklahoma State Department of Health, Air Quality Service, P.O. Box 53551, Oklahoma City, Oklahoma 73152.[62]

(MM) State of Oregon, Department of Environmental Quality, 1234 SW Morrison Street, Portland, Oregon 97205.[14]

(viii) Lane Regional Air Pollution Authority, 1244 Walnut Street, Eugene, Oregon 97403.[64]

(NN) (a) Commonwealth of Pennsylvania (except for City of Philadelphia and Allegheny County) Pennsylvania Department of Environmental Resources, Bureau of Air Quality and Noise Control, Post Office Box 2063, Harrisburg, Pennsylvania 17120.

(b) City of Philadelphia. Philadelphia Department of Public Health Air Management Services, 801 Arch Street, Philadelphia, Pennsylvania 19107.[35]

(OO) State of Rhode Island, Department of Environmental Management, 83 Park Street, Providence, R.I. 02908[50]

(PP) State of South Carolina, Office of Environmental Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201.[3]

(QQ) [Reserved]

(RR) Division of Air Pollution Control, Tennessee Department of Public Health, 256 Capitol Hill Building, Nashville, Tennessee 37219[56]

(SS) State of Texas, Texas Air Control Board, 8520 Shoal Creek Boulevard, Austin, Texas 78758.[51]

(TT) [reserved]

(UU) State of Vermont, Agency of Environmental Protection, Box 489, Montpelier, Vermont 05602.[33]

(VV) Commonwealth of Virginia, Virginia State Air Pollution Control Board, Room 1106, Ninth Street Office Building, Richmond, Virginia 23219.[15]

(WW) (i) Washington; State of Washington, Department of Ecology, Olympia, Washington 98504.

(ii) Northwest Air Pollution Authority, 207 Pioneer Building, Second and Pine Streets, Mount Vernon, Washington 98273.

(iii) Puget Sound Air Pollution Control Agency, 410 West Harrison Street, Seattle, Washington 98119.

(iv) Spokane County Air Pollution Control Authority, North 811 Jefferson, Spokane, Washington 99201.

(v) Yakima County Clean Air Authority, County Courthouse, Yakima, Washington 98901.[4,10]

(vi) Olympic Air Pollution Control Authority, 120 East State Avenue, Olympia, Washington 98501.

(vii) Southwest Air Pollution Control Authority, Suite 7601 H, NE Hazel Dell Avenue, Vancouver, Washington 98665.[13]

(XX) [Reserved]

(YY) Wisconsin—Wisconsin Department of Natural Resources, P.O. Box 7921, Madison, Wisconsin 53707.[37]

(ZZ) [Reserved]

(AAA) [Reserved]

(BBB)—Commonwealth of Puerto Rico Commonwealth of Puerto Rico Environmental Quality Board, P.O Box 11785. Santurce, P.R. 00910.[43]

(CCC) U.S. Virgin Islands: U.S. Virgin Islands Department of Conservation and Cultural Affairs, P.O. Box 578, Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00801.[22]

(Secs. 101, 110, 111, 112 and 301 of the Clean Air Act, as amended, 42 U.S.C. 1857, 1857c-5, 6, 7 and 1857g.)

§ 61.05 Prohibited activities.

(a) After the effective date of any standard prescribed under this part, no owner or operator shall construct or modify any stationary source subject to such standard without first obtaining written approval of the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the act. Sources, the construction or modification of which commenced after the publication date of the standards proposed to be applicable to such source, are subject to this prohibition.

(b) After the effective date of any standard prescribed under this part, no owner or operator shall operate any new source in violation of such standard except under an exemption granted by the President under section 112(c)(2) of the act.

(c) Ninety days after the effective date of any standard prescribed under this part, no owner or operator shall operate any existing stationary source in violation of such standard, except under a waiver granted by the Administrator in accordance with this subpart or under an exemption granted by the President under section 112(c)(2) of the act.

(d) No owner or operator subject to the provisions of this part shall fail to report, revise reports, or report source test results as required under this part.

§ 61.06 Determination of construction or modification.

Upon written application by an owner or operator, the Administrator will make a determination of whether actions taken or intended to be taken by such owner or operator constitute construction or modification or the commencement thereof within the meaning of this part. The Administrator will within 30 days of receipt of sufficient information to evaluate an application, notify the owner or operator of his determination.

§ 61.07 Application for approval of construction or modification.

(a) The owner or operator of any new source to which a standard prescribed under this part is applicable shall, prior to the date on which construction or modification is planned to commence, or within 30 days after the effective date in the case of a new source that already has commenced construction or modification and has not begun operation, submit to the Administrator an application for approval of such construction or modification. A separate application shall be submitted for each stationary source.

(b) Each application shall include:

(1) The name and address of the applicant.

(2) The location or proposed location of the source.

(3) Technical information describing the proposed nature, size, design, operating design capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of such calculations.

§ 61.08 Approval by Administrator.

(a) The Administrator will, within 60 days of receipt of sufficient information to evaluate an application under § 61.07, notify the owner or operator of approval or intention to deny approval of construction or modification.

(b) If the Administrator determines that a stationary source for which an application pursuant to § 61.07 was submitted will, if properly operated, not cause emissions in violation of a standard, he will approve the construction or modification of such source.

(c) Prior to denying any application for approval of construction or modification pursuant to this section, the Administrator will notify the owner or operator making such application of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator shall specify, additional information or arguments to the Administrator prior to final action on such application.

(d) A final determination to deny any application for approval will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days of presentation of additional information or arguments, or 60 days after the final date specified for presentation, if no presentation is made.

(e) Neither the submission of an application for approval nor the Administrator's granting of approval to construct or modify shall:

(1) Relieve an owner or operator of legal responsibility for compliance with any applicable provision of this part or of any other applicable Federal, State, or local requirement, or

(2) Prevent the Administrator from implementing or enforcing this part or taking any other action under the act.

§ 61.09 Notification of startup.

(a) Any owner or operator of a source which has an initial startup after the effective date of a standard prescribed under this part shall furnish the Administrator written notification as follows:

(1) A notification of the anticipated date of initial startup of the source not more than 60 days nor less than 30 days prior to such date.

(2) A notification of the actual date of initial startup of the source within 15 days after such date.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).

§ 61.10 Source reporting and waiver request.

(a) The owner or operator of any existing source, or any new source to which a standard prescribed under this part is applicable which had an initial startup which preceded the effective date of a standard prescribed under this part shall, within 90 days after the effective date, provide the following information in writing to the Administrator:

(1) Name and address of the owner or operator.

(2) The location of the source.

(3) The type of hazardous pollutants emitted by the stationary source.

(4) A brief description of the nature, size, design, and method of operation of the stationary source including the operating design capacity of such source. Identify each point of emission for each hazardous pollutant.

(5) The average weight per month of the hazardous materials being processed by the source, over the last 12 months preceding the date of the report.

(6) A description of the existing control equipment for each emission point.

(i) Primary control device(s) for each hazardous pollutant.

(ii) Secondary control device(s) for each hazardous pollutant.

(iii) Estimated control efficiency (percent) for each control device.

(7) A statement by the owner or operator of the source as to whether he can comply with the standards prescribed in this part within 90 days of the effective date.

(b) The owner or operator of an existing source unable to operate in compliance with any standard prescribed under this part may request a waiver of compliance with such standard for a period not exceeding 2 years from the effective date. Any request shall be in writing and shall include the following information:

(1) A description of the controls to be installed to comply with the standard.

(2) A compliance schedule, including the date each step toward compliance will be reached. Such list shall include as a minimum the following dates:

(i) Date by which contracts for emission control systems or process modifications will be awarded, or date by which orders will be issued for the purchase of component parts to accomplish emission control or process modification;

(ii) Date of initiation of onsite construction or installation of emission control equipment or process change;

(iii) Date by which onsite construction or installation of emission control equipment or process modification is to be completed; and

(iv) Date by which final compliance is

to be achieved.

(3) A description of interim emission control steps which will be taken during the waiver period.

(c) Changes in the information provided under paragraph (a) of this section shall be provided to the Administrator within 30 days after such change, except that if changes will result from modification of the source, as defined in § 61.02 (j), the provisions of § 61.07 and § 61.08 are applicable.

(d) The format for reporting under this section is included as Appendix A of this part. Advice on reporting the status of compliance may be obtained from the Administrator.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.11 Waiver of compliance.

(a) Based on the information provided in any request under § 61.10, or other information, the Administrator may grant a waiver of compliance with a standard for a period not exceeding 2 years from the effective date of such standard.

(b) Such waiver will be in writing and will:

(1) Identify the stationary source covered.

(2) Specify the termination date of the waiver. The waiver may be terminated at an earlier date if the conditions specified under paragraph (b)(3) of this section are not met.

(3) Specify dates by which steps toward compliance are to be taken; and impose such additional conditions as the Administrator determines to be necessary to assure installation of the necessary controls within the waiver period, and to assure protection of the health of persons during the waiver period.

(c) Prior to denying any request for a waiver pursuant to this section, the Administrator will notify the owner or operator making such request of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator specifies, additional information or arguments to the Administrator prior to final action on such request.

(d) A final determination to deny any request for a waiver will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days after presentation of additional information or arguments, or 60 days after the final date specified for such presentation, if no presentation is made.

(e) The granting of a waiver under this section shall not abrogate the Administrator's authority under section 114 of the act.

§ 61.12 Emission tests and monitoring.

(a) Emission tests and monitoring shall be conducted and reported as set forth in this part and Appendix B to this part.

(b) The owner or operator of a new source subject to this part, and at the or operator of an existing source subject to this part, shall provide or cause to be provided, emission testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such source.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.13 Waiver of emission tests.

(a) Emission tests may be waived upon written application to the Administrator if, in his judgment, the source is meeting the standard, or if the source is operating under a waiver of compliance or has requested a waiver of compliance.

(b) If application for waiver of the emission test is made, such application shall accompany the information required by § 61.10. The appropriate form is contained in Appendix A to this part.

(c) Approval of any waiver granted pursuant to this section shall not abrogate the Administrator's authority under the act or in any way prohibit the Administrator from later canceling such waiver. Such cancellation will be made only after notice is given to the owner or operator of the source.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.14 Source test and analytical methods.

(a) Methods 101, 101A, 102, and 104 in Appendix B to this part shall be used for all source tests required under this part, unless an equivalent method or an alternative method has been approved by the Administrator.[66]

(b) Method 103 in Appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.32(a) and § 61.42 (b).

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraphs (a), (b) or (d) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.[7]

(d) Method 105 in Appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.52(b).[7]

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.15 Availability of information.[23]

The availability to the public of information provided to, or otherwise obtained by, the Administrator under this part shall be governed by Part 2 of this chapter.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.16 State authority.

(a) The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(1) Adopting and enforcing any emission limiting regulation applicable to a stationary source, provided that such emission limiting regulation is not less stringent than the standards prescribed under this part.

(2) Requiring the owner or operator of a stationary source, other than a stationary source owned or operated by the United States, to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such source.

(Sec. 116, Clean Air Act as amended (42 U.S.C. 7416)).[40,47]

§ 61.17 Circumvention.[7]

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous dilutants to achieve compliance with a visible emissions standard, and the piecemeal carrying out of an operation to avoid coverage by a standard that applies only to operations larger than a specified size.

Subpart B—National Emission Standard for Asbestos

§ 61.20 Applicability.

The provisions of this subpart are applicable to those sources specified in § 61.22.

§ 61.21 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Asbestos" means actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite.

(b) "Asbestos material" means asbestos or any material containing asbestos.

(c) "Particulate asbestos material" means finely divided particles of asbestos material.

(d) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(e) "Outside air" means the air outside buildings and structures.

(f) "Visible emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

(g) "Asbestos mill" means any facility engaged in the conversion or any intermediate step in the conversion of asbestos ore into commercial asbestos. Outside storage of asbestos materials is not considered a part of such facility.[2]

(h) "Commercial asbestos" means any variety of asbestos which is produced by extracting asbestos from asbestos ore.[2]

(i) "Manufacturing" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material(s), including commercial asbestos, and the processing of this combination into a product as specified in § 61.22(c).[2]

(j) "Demolition" means the wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos materials.[2,7]

(k) "Friable asbestos material" means any material that contains more than 1 percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure.[7]

(l) "Control device asbestos waste" means any asbestos-containing waste material that is collected in a pollution control device.[7]

(m) "Renovation" means the removing or stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.[7,49]

(n) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Operations that are individually non-scheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience.[7]

(o) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included.[7]

(p) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.[7]

(q) "Removing" means taking out friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation.[7,49]

(r) "Stripping" means taking off friable asbestos materials from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.[7,49]

(s) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations.[7]

(t) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic.[7]

(u) "Active waste disposal site" means any disposal site other than an inactive site.[7]

(v) "Roadways" means surfaces on which motor vehicles travel including, but not limited to, highways, roads, streets, parking areas, and driveways.[7]

(w) "Asbestos-containing waste material" means any waste which contains commercial asbestos and is generated by a source subject to the provisions of this subpart, including asbestos mill tailings, control device asbestos waste, friable asbestos waste material, and bags or containers that previously contained commercial asbestos.[7]

(x) "Structural member" means any load-supporting member, such as beams and load-supporting walls; or any non-load-supporting member, such as ceilings and non-load-supporting walls.[36]

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section.[2]

(b) Roadways: The surfacing of roadways with asbestos tailings or with asbestos-containing waste that is generated by any source subject to paragraphs (c), (d), (e) or (h) of this section is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadways covered with snow or ice is considered "surfacing."[7]

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.[7]

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(10) The manufacture of shotgun shells.[7]

(11) The manufacture of asphalt concrete.[7]

(d) *Demolition and renovation.* The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is covered or coated with friable asbestos materials, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca. 260 feet) of pipe covered or coated with friable asbestos materials are stripped or removed, or more than 15 square meters, (ca. 160 square feet) of friable asbestos materials used to cover or coat any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed.[7,49]

(1) (i) The owner or operator of a demolition operation is exempted from the requirements of this paragraph: *Provided,* (A) The amount of friable asbestos materials in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used on pipes, and less than 15 square meters (ca. 160 square feet) used on any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (B) the notification requirements of paragraph (d)(1)(ii) are met.[2,7,49]

(ii) Written notification shall be postmarked or delivered to the Administrator at least 20 days prior to commencement of demolition and shall include the information required by paragraph (d)(2) of this section, with

the exception of the information required by paragraphs (d)(2) (iii), (vi), (vii), (viii), and (ix) of this section, and shall state the measured or estimated amount of friable asbestos materials which is present. Techniques of estimation shall be explained.[2,7,49]

(2) Written notice of intention to demolish or renovate shall be provided to the Administrator by the owner or operator of the demolition or renovation operation. Such notice shall be postmarked or delivered to the Administrator at least 10 days prior to commencement of demolition, or as early as possible prior to commencement of emergency demolition subject to paragraph (d) (6) of this section, and as early as possible prior to commencement of renovation. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos materials present.[49]

(iv) Address or location of the building, structure, facility, or installation.

(v) Scheduled starting and completion dates of demolition or renovation.

(vi) Nature of planned demolition or renovation and method(s) to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph and paragraph (j) of this section.

(viii) The name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

(ix) Name, title, and authority of the State or local governmental representative who has ordered a demolition which is subject to paragraph (d) (6) of this section.

(3) (i) For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

(A) For planned renovating operations involving individually non-scheduled operations, the additive amount of friable asbestos material that can be predicted will be removed or stripped at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and not longer than one year.

(B) For each planned renovating operation not covered by paragraph (d) (3) (i) (A), the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

(ii) For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(4) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation, that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used on any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such materials shall be adequately wetted whenever exposed during demolition.[49]

(ii) Friable asbestos materials used on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d)(4)(iv), (d)(4)(vi), or (d)(vii) of this section.[49]

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are covered or coated with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjoining are adequately wetted during the cutting or disjoining operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.[49]

(iv) The stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos materials. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.[49]

(v) All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that such materials remain wet during all remaining stages of demolition or renovation and related handling operations. Such materials shall not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

(vi) Except as specified below, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, such materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall, to the maximum extent possible, be removed as units or in sections prior to wrecking. In no case shall the requirements of paragraphs (d) (4) (iv) or (d) (4) (v) be suspended due to freezing temperatures.

(vii) For renovation operations, local exhaust ventilation and collection systems may be used, instead of wetting as specified in paragraph (d) (4) (ii), to prevent emissions of particulate asbestos material to outside air when damage to equipment resulting from the wetting would be unavoidable. Upon request and supply of adequate information, the Administrator will determine whether damage to equipment resulting from wetting to comply with the provisions of this paragraph would be unavoidable. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems, except as provided in paragraph (f) of this section.[2,7]

(5) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(6) The demolition of a building, structure, facility, or installation, pursuant to an order of an authorized representative of a State or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of paragraph (d) of this section:

(i) The notification requirements specified by paragraph (d) (2) of this section;

(ii) The requirements on stripping of friable asbestos materials from previously removed units or sections as specified in paragraph (d) (4) (iv) of this section;

(iii) The wetting, as specified by paragraph (d) (4) (v) of this section, of fri- removed or stripped;

(iv) The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation.[7]

(e) *Spraying.* There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbestos, on a dry weight basis, used on equipment and machinery, except as provided in paragraph (f) of this section. Materials sprayed on buildings, structures, structural members, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.[49]

(1) Sources subject to this paragraph are exempt from the requirements of § 61.05(a), § 61.07, and § 61.09.

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis on equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information: [7,49]

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Location of spraying operation.

(iv) Procedures to be followed to meet the requirements of this paragraph.

(3) The spray-on application of materials in which the asbestos fibers are encapsulated with a bituminous or resinous binder during spraying and which are not friable after drying is exempted from the requirements of paragraphs (e) and (e)(2) of this section. [49]

(f) Rather than meet the no-visible-emission requirements as specified by paragraphs (a), (c), (d), (e), (h), (j), and (k) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), (d), (e), (h), (j), or (k) of this section, such failure shall not be a violation of such emission requirements.[2,7]

(h) Fabricating: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture; bulkheads, partitions and ceilings for marine construction; and flow control devices for the molten metal industry.

(i) Insulating: Molded insulating materials which are friable and wet-applied insulating materials which are friable after drying, installed after the effective date of these regulations, shall contain no commercial asbestos. The provisions of this paragraph do not apply to insulating materials which are spray applied; such materials are regulated under § 61.22(e).

(j) Waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations: The owner or operator of any source covered under the provisions of paragraphs (c), (d), (e), or (h) of this section shall meet the following standards:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (j)(3) of this section, during the collection; processing, including incineration; packaging; transporting; or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section shall be labeled with a warning label that states:

CAUTION

Contains Asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous
to Your Health

Alternatively, warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.93a(g)(2)(ii) may be used.

(ii) Processing of asbestos-containing waste material into non-friable forms:

(A) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(B) There shall be no visible emissions to the outside air from the collection and processing of asbestos-containing waste material, except as specified in paragraph (f) of this section.

(4) For the purposes of this paragraph (j), the term all asbestos-containing waste material as applied to demolition and renovation operations covered by paragraph (d) of this section includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills: The owner or operator of any source covered under the provisions of paragraph (a) of this section shall meet the following standard:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (k)(3) of this section, during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3)(i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(i) There shall be no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in paragraph (f) of this section. Such waste shall be subsequently processed either as specified in paragraph (k)(3)(ii) of this section or as specified in paragraph (j)(3) of this section.

(ii) All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. Such agent shall be used as recommended for the particular dust by the manufacturer of the agent. There shall be no discharge of visible emissions to the outside air from the wetting operation except as specified in paragraph (f) of this section. Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5°C (ca. 15°F). The ambient air temperature shall be determined by an appropriate measurement method with an accuracy of ±1°C (±2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of such temperature measurements shall be retained at the source for a minimum of two years and made available for inspection by the Administrator.

(l) The owner of any inactive waste disposal site, which was operated by sources covered under § 61.22 (a), (c) or (h) and where asbestos-containing waste material produced by such sources was deposited, shall meet the following standards:

(1) There shall be no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in paragraph (l)(5) of this section.

(2) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca. 330 ft) or less, except as specified in paragraph (l)(4)

of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20'' x 14'' upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos is Hazardous
to Your Health

Notation

1'' Sans Serif, Gothic or Block

¾'' Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (l)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of paragraphs (l)(5) (i) or (ii) of this section are met, or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirement of paragraph (l)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which has received prior approval by the Administrator.

(i) The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

(ii) The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of the asbestos-containing waste; or

(iii) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. Such agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.[7]

§ 61.23 Air-cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.22(d)(4)(iv), the requirements of this section must be met.[7]

(a) Fabric filter collection devices must be used, except as noted in paragraphs (b) and (c) of this section. Such devices must be operated at a pressure drop of no more than 4 inches water gage, as measured across the filter fabric. The airflow permeability, as determined by ASTM method D737–69, must not exceed 30 $ft^3/min/ft^2$ for woven fabrics or 35 $ft^3/min/ft^2$ for felted fabrics, except that 40 $ft^3/min/ft^2$ for woven and 45 $ft^3/min/ft^2$ for felted fabrics is allowed for filtering air from asbestos ore dryers. Each square yard of felted fabric must weigh at least 14 ounces and be at least one-sixteenth inch thick throughout. Synthetic fabrics must not contain fill yarn other than that which is spun.

(b) If the use of fabric filters creates a fire or explosion hazard, the administrator may authorize the use of wet collectors designed to operate with a unit contacting energy of at least 40 inches water gage pressure.

(c) The administrator may authorize the use of filtering equipment other than that described in paragraphs (a) and (b) of this section if the owner or operator demonstrates to the satisfaction of the administrator that the filtering of particulate asbestos material is equivalent to that of the described equipment.

(d) All air-cleaning equipment authorized by this section must be properly installed, used, operated, and maintained. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

§ 61.24 Reporting.

The owner or operator of any existing source to which this subpart is applicable shall, within 90 days after the effective date, provide the following information to the administrator:

(a) A description of the emission control equipment used for each process;

(b) If a fabric filter device is used to control emissions, the pressure drop across the fabric filter in inches water gage.

(1) If the fabric filter device utilizes a woven fabric, the airflow permeability in $ft^3/min/ft^2$; and, if the fabric is synthetic, indicate whether the fill yarn is spun or not spun.

(2) If the fabric filter device utilizes a felted fabric, the density in oz/yd^2, the minimum thickness in inches, and the airflow permeability in $ft^3/min/ft^2$.

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.[7]

(d) For sources subject to § 61.22(l):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used.[7]

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))[40,47]

§ 61.25 Waste disposal sites.

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in paragraph (e) of this section.

(b) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 m (ca. 330 ft) or less except as specified in paragraph (d) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20'' x 14'' upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND

ASBESTOS WASTE DISPOSAL SITE

Do Not Create Dust

Breathing Asbestos
is Hazardous to Your Health

Notation

1'' Sans Serif, Gothic or Block

¾'' Sans Serif, Gothic or Block

14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (e)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section, or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. Such agent shall be used as recommended for the particular dust by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

38 FR 8826, 4/6/73 (1)

as amended

39 FR 15398, 5/3/74 (2)
40 FR 48299, 10/14/76 (7)
42 FR 12127, 3/2/77 (36)
42 FR 41424, 8/17/77 (40)
43 FR 8800, 3/3/78 (47)
43 FR 26372, 6/19/78 (49)

Subpart C—National Emission Standard for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following stationary sources:

(a) Extraction plans, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

(b) Machine shops which process beryllium, beryllium oxides, or any alloy when such alloy contains more than 5 percent beryllium by weight.

§ 61.31 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or performing any of the intermediate steps in these processes.

(c) "Beryllium ore" means any naturally occurring material mined or gathered for its beryllium content.

(d) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, etching, or other similar operations.

(e) "Ceramic plant" means a manufacturing plant producing ceramic items.

(f) "Foundry" means a facility engaged in the melting or casting of beryllium metal or alloy.

(g) "Beryllium-containing waste" means material contaminated with beryllium and/or beryllium compounds used or generated during any process or operation performed by a source subject to this subpart.

. (h) "Incinerator" means any furnace used in the process of burning waste for the primary purpose of reducing the volume of the waste by removing combustible matter.

(i) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content and which contains more than 0.1 percent beryllium by weight.

(k) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant.

§ 61.32 Emission standard.

(a) Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 10 grams of beryllium over a 24-hour period, except as provided in paragraph (b) of this section.

(b) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may request approval from the Administrator to meet an ambient concentration limit on beryllium in the vicinity of the stationary source of 0.01 $\mu g/m^3$, averaged over a 30-day period.

(1) Approval of such requests may be granted by the Administrator provided that:

(i) At least 3 years of data is available which in the judgment of the Administrator demonstrates that the future ambient concentrations of beryllium in the vicinity of the stationary source will not exceed 0.01 $\mu g/m^3$, averaged over a 30-day period. Such 3-year period shall be the 3 years ending 30 days before the effective date of this standard.

(ii) The owner or operator requests such approval in writing within 30 days after the effective date of this standard.

(iii) The owner or operator submits a report to the Administrator within 45 days after the effective date of this standard which report includes the following information:

(*a*) Description of sampling method including the method and frequency of calibration.

(*b*) Method of sample analysis.

(*c*) Averaging technique for determining 30-day average concentrations.

(*d*) Number, identity, and location (address, coordinates, or distance and heading from plant) of sampling sites.

(*e*) Ground elevations and height above ground of sampling inlets.

(*f*) Plant and sampling area plots showing emission points and sampling sites. Topographic features significantly affecting dispersion including plant building heights and locations shall be included.

(*g*) Information necessary for estimating dispersion including stack height, inside diameter, exit gas temperature, exit velocity or flow rate, and beryllium concentration.

(*h*) A description of data and procedures (methods or models) used to design the air sampling network (i.e., number and location of sampling sites).

(*i*) Air sampling data indicating beryllium concentrations in the vicinity of the stationary source for the 3-year period specified in paragraph (b)(1) of this section. This data shal be presented chronologically and include the beryllium concentration and location of each individual sample taken by the network and the corresponding 30-day average beryllium concentrations.

(2) Within 60 days after receiving such report, the Administrator will notify the owner or operator in writing whether approval is granted or denied. Prior to denying approval to comply with the provisions of paragraph (b) of this section, the Administrator will consult with representatives of the statutory source for which the demonstration report was submitted.

(c) The burning of beryllium and/or beryllium-containing waste, except propellants, is prohibited except in incinerators, emissions from which must comply with the standard.

§ 61.33 Stack sampling.

(a) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator required to comply with § 61.32(a) shall test emissions from his source,

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to an emission test so that he may at his option observe the test.

(c) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in any 24-hour period. Where emissions depend upon the relative frequency of operation of different types of processes, operating hours, operating capacities, or other factors, the calculation of maximum 24-hour-period emissions will be based on that combination of factors which is likely to occur during the subject period and which result in the maximum emissions. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until a new emission level has been estimated by calculation and the results reported to the Administrator.

(d) All samples shall be analyzed and beryllium emissions shall be determined within 30 days after the source test. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). 40,47

§ 61.34 Air sampling.

(a) Stationary sources subject to § 61.32(b) shall locate air sampling sites in accordance with a plan approved by the Administrator. Such sites shall be located in such a manner as is calculated to detect maximum concentrations of beryllium in the ambient air.

(b) All monitoring sites shall be operated continuously except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacement of equipment needing major repair.

(c) Filters shall be analyzed and concentrations calculated within 30 days after filters are collected. Records of concentrations at all sampling sites and other data needed to determine such concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) Concentrations measured at all sampling sites shall be reported to the Administrator every 30 days by a registered letter.

(e) The Administrator may at any time require changes in, or expansion of, the sampling network.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

38 FR 8826, 4/6/73 (1)

as amended

42 FR 41424, 8/17/77 (40)
43 FR 8800, 3/3/78 (47)

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

§ 61.40 Applicability.

The provisions of this subpart are applicable to rocket motor test sites.

§ 61.41 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Rocket motor test site" means any building, structure, facility, or installation where the static test firing of a beryllium rocket motor and/or the disposal of beryllium propellant is conducted.

(b) "Beryllium propellant" means any propellant incorporating beryllium.

§ 61.42 Emission standard.

(a) Emissions to the atmosphere from rocket-motor test sites shall not cause time-weighted atmospheric concentrations of beryllium to exceed 75 microgram minutes per cubic meter of air within the limits of 10 to 60 minutes, accumulated during any 2 consecutive weeks, in any area in which an effect adverse to public health could occur.

(b) If combustion products from the firing of beryllium propellant are collected in a closed tank, emissions from such tank shall not exceed 2 grams per hour and a maximum of 10 grams per day.

§ 61.43 Emission testing—rocket firing or propellant disposal.

(a) Ambient air concentrations shall be measured during and after firing of a rocket motor or propellant disposal and in such a manner that the effect of these emissions can be compared with the standard. Such sampling techniques shall be approved by the Administrator.

(b) All samples shall be analyzed and results shall be calculated within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All results shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following determination of such results.

(c) Records of air sampling test results and other data needed to determine integrated intermittent concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an air sampling test, so that he may at his option observe the test.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). 40,47

§ 61.44 Stack sampling.

(a) Sources subject to § 61.42(b) shall be continuously sampled, during release of combustion products from the tank, in such a manner that compliance with the standards can be determined. The provisions of § 61.14 shall apply.

(b) All samples shall be analyzed, and beryllium emissions shall be determined within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determinations.

(c) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). 40,47

38 FR 8826, 4/6/73 (1)

as amended

42 FR 41424, 8/17/77 (40)
43 FR 8800, 3/3/78 (47)

Subpart E—National Emission Standard for Mercury

§ 61.50 Applicability.[7]

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge.

§ 61.51 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulates, vapors, aerosols, and compounds.

(b) "Mercury ore" means a mineral mined specifically for its mercury content.

(c) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(d) "Condenser stack gases" mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

(e) "Mercury chlor-alkali cell" means a device which is basically composed of an electrolyzer section and a denuder (decomposer) section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(f) "Mercury chlor-alkali electrolyzer" means an electrolytic device which is part of a mercury chlor-alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

(g) "Denuder" means a horizontal or vertical container which is part of a mercury chlor-alkali cell and in which water and alkali metal amalgam are converted to alkali metal hydroxide, mercury, and hydrogen gas in a short-circuited, electrolytic reaction.

(h) "Hydrogen gas stream" means a hydrogen stream formed in the chlor-alkali cell denuder.

(i) "End box" means a container(s) located on one or both ends of a mercury chlor-alkali electrolyzer which serves as a connection between the electrolyzer and denuder for rich and stripped amalgam.

(j) "End box ventilation system" means a ventilation system which collects mercury emissions from the end-boxes, the mercury pump sumps, and their water colection systems.

(k) "Cell room" means a structure(s) housing one or more mercury electrolytic chlor-alkali cells.

(l) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial waste waters.[7]

(m) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C (ca. 150°F) directly with combustion gases.[7]

§ 61.52 Emission standard.[7]

(a) Emissions to the atmosphere from mercury ore processing facilities and mercury cell chlor-alkali plants shall not exceed 2300 grams of mercury per 24-hour period.

(b) Emissions to the atmosphere from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges shall not exceed 3200 grams of mercury per 24-hour period.

§ 61.53 Stack sampling.

(a) Mercury ore processing facility.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator processing mercury ore shall test emissions from his source,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(b) Mercury chlor-alkali plant—hydrogen and end-box ventilation gas streams.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator employing mercury chlor-alkali cell(s) shall test emissions from his source,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed and mercury emisions shall be determined within 30 days after the source test. All the determinations will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(c) Mercury chlor-alkali plants—cell room ventilation system.

(1) Stationary sources using mercury chlor-alkali cells may test cell room emissions in accordance with paragraph (c)(2) of this section or demonstrate compliance with paragraph (c)(4) of this section and assume ventilation emissions of 1,300 gms/day of mercury.

(2) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator shall pass all cell room air in forced gas streams through stacks suitable for testing,

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) An owner or operator may carry out approved design, maintenance, and housekeeping practices. A list of approved design, maintenance, and housekeeping practices may be obtained from the Administrator.

(d) Sludge incineration and drying plants.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator of a source subject to the standard in § 61.52(b) shall test emissions from that source. Such tests shall be conducted in accordance with the procedures set forth either in paragraph (d) of this section or in § 61.54.

(2) Method 101A in Appendix B to this part shall be used to test emissions as follows:[66]

(i) The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date.[66]

(ii) The test shall be performed within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.[66]

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.[7]

(4) Samples shall be taken over such a period or periods as are necessary to determine accurately the maximum emissions which will occur in a 24-hour period. No changes shall be made in the operation which would potentially increase emissions above the level determined by the most recent stack test, until the new emission level has been estimated by calculation and the results reported to the Administrator.[7]

(5) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the stack test. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.[7]

(6) Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available, for inspection by the Administrator, for a minimum of 2 years.[7]

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.54 Sludge sampling.[7]

(a) As an alternative means for demonstrating compliance with § 61.52 (b), an owner or operator may use Method 105 of Appendix B and the procedures specified in this section.

(1) A sludge test shall be conducted within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) A sludge test shall be conducted within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to a sludge sampling test, so that he may at his option observe the test.

(c) Sludge shall be sampled according to paragraph (c)(1) of this section, sludge charging rate for the plant shall be determined according to paragraph (c)(2) of this section, and the sludge analysis shall be performed according to paragraph (c)(3) of this section.

(1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the first grab sample is obtained. Samples shall not be exposed to any condition that may result in mercury contamination or loss.

(2) The maximum 24-hour period sludge incineration or drying rate shall be determined by use of a flow rate measurement device that can measure the mass rate of sludge charged to the incinerator or dryer with an accuracy of ±5 percent over its operating range. Other methods of measuring sludge mass charging rates may be used if they have received prior approval by the Administrator.

(3) The handling, preparation, and analysis of sludge samples shall be accomplished according to Method 105 in Appendix B of this part.

(d) The mercury emissions shall be determined by use of the following equation:

$$E_{Hg} = 1 \times 10^{-3} \, cQ$$

where

E_{Hg} = Mercury emissions, g/day.
c = Mercury concentration of sludge on a dry solids basis, μg/g (ppm).
Q = Sludge charging rate, kg/day.

(e) No changes in the operation of a plant shall be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(f) All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(g) Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.55 Emission monitoring.[7]

(a) Wastewater treatment plant sludge incineration and drying plants. All such sources for which mercury emissions exceed 1600 g/day, demonstrated either by stack sampling according to § 61.53 or sludge sampling according to § 61.54, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54(c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54(f) and (g).

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

38 FR 8826, 4/6/73 (1)

as amended

40 FR 48299, 10/14/75 (7)
42 FR 41424, 8/17/77 (40)
43 FR 8800, 3/3/78 (47)
47 FR 24703, 6/8/82 (66)

Subpart F—National Emission Standard for Vinyl Chloride [28]

§ 61.60 Applicability.

(a) This subpart applies to plants which produce:

(1) Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

(2) Vinyl chloride by any process, and/or

(3) One or more polymers containing any fraction of polymerized vinyl chloride.

(b) This subpart does not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of no more than 0.19 m^3 (50 gal).

(c) Sections of this subpart other than §§ 61.61; 61.64 (a)(1), (b), (c), and (d); 61.67; 61.68; 61.69; 61.70; and 61.71 do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 0.19 m^3 (50 gal) and no more than 4.07 m^3 (1100 gal).[38]

§ 61.61 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Ethylene dichloride plant" includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(b) "Vinyl chloride plant" includes any plant which produces vinyl chloride by any process.

(c) "Polyvinyl chloride plant" includes any plant where vinyl chloride alone or in combination with other materials is polymerized.

(d) "Slip gauge" means a gauge which has a probe that moves through the gas/liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

(e) "Type of resin" means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk, and solution processes.

(f) "Grade of resin" means the subdivision of resin classification which describes it as a unique resin, i.e., the most exact description of a resin with no further subdivision.

(g) "Dispersion resin" means a resin manufactured in such away as to form fluid dispersions when dispersed in a plasticizer or plasticizer/diluent mixtures.

(h) "Latex resin" means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is sold undried.

(i) "Bulk resin' 'means a resin which is produced by a polymerization process in which no water is used.

(j) "Inprocess wastewater" means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product containing vinyl chloride or polyvinyl chloride but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(k) "Wastewater treatment process" includes any process which modifies characteristics such as BOD, COD, TSS, and pH, usually for the purpose of meeting effluent guidelines and standards; it does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of this subpart.

(l) "In vinyl chloride service" means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

(m) "Standard operating procedure" means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons responsible for carrying out the procedure.

(n) "Run" means the net period of time during which an emission sample is collected.

(o) "Ethylene dichloride purification" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(p) "Vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(q) "Reactor" includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(r) "Reactor opening loss" means the emissions of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge as defined in § 61.65(a).

(s) "Stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

(t) "Standard temperature" means a temperature of 20° C (69° F).[38]

(u) "Standard pressure" means a pressure of 760 mm of Hg (29.92 in. of Hg).[38]

§ 61.62 Emission standard for ethylene dichloride plants.[38]

(a) Ethylene dichloride purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from each oxychlorination reactor are not to exceed 0.2 g/kg (0.0002 lb/lb) of the 100 percent ethylene dichloride product from the oxychlorination process.

§ 61.63 Emission standard for vinyl chloride plants.

An owner or operator of a vinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Vinyl chloride formation and purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

§ 61.64 Emission standard for polyvinyl chloride plants.

An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) *Reactor*. The following requirements apply to reactors:

(1) The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each reactor is not to exceed 10 ppm, except as provided in paragraph (a)(2) of this section and § 61.65(a).

(2) The reactor opening loss from each reactor is not to exceed 0.02 g vinyl chloride/kg (0.00002 lb vinyl chloride/lb) of polyvinyl chloride product, with the product determined on a dry solids basis. This requirement applies to any vessel which is used as a reactor or as both a reactor and a stripper. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

(3) Manual vent valve discharge: Except for an emergency manual vent valve discharge, there is to be no discharge to the atmosphere from any manual vent valve on a polyvinyl chloride reactor in vinyl chloride service. An emergency manual vent valve discharge means a discharge to the atmosphere which could not have been avoided by taking measures to prevent the discharge. Within 10

days of any discharge to the atmosphere from any manual vent valve, the owner or operator of the source from which the discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) *Stripper*. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(c) *Mixing, weighing, and holding containers*. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper (or the reactor if the plant has no stripper) in the plant process flow is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(d) *Monomer recovery system*. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each monomer recovery system is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(e) *Sources following the stripper(s)*. The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) [or the reactor(s) if the plant has no stripper(s)] in the plant process flow including but not limited to, centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and inprocess wastewater:

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed:

(i) 2000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(ii) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere may not exceed:

(i) 2 g/kg (0.002 lb/lb) product from the stripper(s) [or reactor(s) if the plant has no stripper(s)] for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(ii) 0.4 g/kg (0.0004 lb/lb) product from the strippers [or reactor(s) if the plant has no stripper(s)] for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this section.

(a) *Relief valve discharge*. Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) *Fugitive emission sources*. (1) *Loading and unloading lines:* Vinyl chloride emissions from loading and unloading lines in vinyl chloride service which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:[38]

(i) After each loading or unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere is to be reduced so that the parts combined contain no greater than 0.0038 m^3 (0.13 ft^3) of vinyl chloride, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from a loading or unloading line in accordance with paragraph (b)(1)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(2) *Slip gauges*. During loading or unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service are to be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(3) Leakage from pump, compressor, and agitator seals:

(i) *Rotating pumps*. Vinyl chloride emissions from seals on all rotating pumps in vinyl chloride service are to be minimized by installing sealless pumps, pumps with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(ii) *Reciprocating pumps*. Vinyl chloride emissions from seals on all reciprocating pumps in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iii) *Rotating compressor*. Vinyl chloride emissions from seals on all rotating compressors in vinyl chloride service are to be minimized by installing compressors with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iv) *Reciprocating compressors*. Vinyl chloride emissions from seals on all reciprocating compressors in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(v) *Agitator*. Vinyl chloride emissions from seals on all agitators in vinyl chloride service are to be minimized by installing agitators with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the agitated vessel; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(4) *Leakage from relief valves.* Vinyl chloride emissions due to leakage from each relief valve on equipment in vinyl chloride service are to be minimized by installing a rupture disk between the equipment and the relief valve, by connecting the relief valve discharge to a process line or recovery system, or equivalent as provided in § 61.66.

(5) *Manual venting of gases.* Except as provided in § 61.64(a)(3), all gases which are manually vented from equipment in vinyl chloride service are to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(6) *Opening of equipment.* Vinyl chloride emissions from opening of equipment (including loading or unloading lines that are not opened to the atmosphere after each loading or unloading operation) are to be minimized as follows:

(i) Before opening any equipment for any reason, the quantity of vinyl chloride is to be reduced so that the equipment contains no more than 2.0 percent by volume vinyl chloride or 0.0950 m³ (25 gal) of vinyl chloride, whichever is larger, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from the equipment in accordance with paragraph (b)(6)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(7) *Samples.* Unused portions of samples containing at least 10 percent by weight vinyl chloride are to be returned to the process, and sampling techniques are to be such that sample containers in vinyl chloride service are purged into a closed process system.

(8) *Leak detection and elimination.* Vinyl chloride emissions due to leaks from equipment in vinyl chloride service are to be minimized by instituting and implementing a formal leak detection and elimination program. The owner or operator shall submit a description of the program to the Administrator for approval. The program is to be submitted within 45 days of the effective date of these regulations, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the program is to be submitted on a date scheduled by the Administrator. Approval of a program will be granted by the Administrator provided he finds:

(i) It includes a reliable and accurate vinyl chloride monitoring system for detection of major leaks and identification of the general area of the plant where a leak is located. A vinyl chloride monitoring system means a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry, flame ion detection, or an equivalent or alternative method.

(ii) It includes a reliable and accurate portable hydrocarbon detector to be used routinely to find small leaks and to pinpoint the major leaks indicated by the vinyl chloride monitoring system. A portable hydrocarbon detector means a device which measures hydrocarbons with a sensitivity of at least 10 ppm and is of such design and size that it can be used to measure emissions from localized points.

(iii) It provides for an acceptable calibration and maintenance schedule for the vinyl chloride monitoring system and portable hydrocarbon detector. For the vinyl chloride monitoring system, a daily span check is to be conducted with a concentration of vinyl chloride equal to the concentration defined as a leak according to paragraph (b)(8)(vi) of this section. The calibration is to be done with either:

(A) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.2 of Test Method 106 and in accordance with section 7.1 of Test Method 106, or [38]

(B) A calibration gas cylinder standard containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard is to have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in section 7.3 of Test Method 106. The requirements in section 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards are to be followed.[38]

(iv) The location and number of points to be monitored and the frequency of monitoring provided for in the program are acceptable when they are compared with the number of pieces of equipment in vinyl chloride service and the size and physical layout of the plant.

(v) It contains an acceptable plan of action to be taken when a leak is detected.

(vi) It contains a definition of leak which is acceptable when compared with the background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system. Measurements of background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system are to be included with the description of the program. The definition of leak for a given plant may vary among the different areas within the plant and is also to change over time as background concentrations in the plant are reduced.

(9) *Inprocess wastewater.* Vinyl chloride emissions to the atmosphere from inprocess wastewater are to be reduced as follows:

(i) The concentration of vinyl chloride in each inprocess wastewater stream containing greater than 10 ppm vinyl chloride measured immediately as it leaves a piece of equipment and before being mixed with any other inprocess wastewater stream is to be reduced to no more than 10 ppm by weight before being mixed with any other inprocess wastewater stream which contains less than 10 ppm vinyl chloride; before being exposed to the atmoshere; before being discharged to a wastewater treatment process; or before being discharged untreated as a wastewater. This paragraph does apply to water which is used to displace vinyl chloride from equipment before it is opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section, but does not apply to water which is used to wash out equipment after the equipment has already been opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section.[30]

(ii) Any vinyl chloride removed from the inprocess wastewater in accordance with paragraph (b)(9)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(c) The requirements in paragraphs (b)(1), (b)(2), (b)(5), (b)(6), (b)(7) and (b)(8) of this section are to be incorporated into a standard operating procedure, and made available upon request for inspection by the Administrator. The standard operating procedure is to include provisions for measuring the vinyl chloride in equipment ≥4.75 m³ (1,250 gal) in volume for which an emission limit is prescribed in § 61.65(b)(6)(i) prior to opening the equipment and using Test Method 106, a portable hydrocarbon detector, or an equivalent or alternative method. The method of measurement is to meet the requirements in § 61.67(g)(5)(i)(A) or (g)((5)(i)(B).[39]

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.66 Equivalent equipment and procedures.

Upon written application from an owner or operator, the Administrator may approve use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing vinyl chloride emissions to the atmosphere to those prescribed for compliance with a specific paragraph of this subpart. For an existing source, any request for using an equivalent method as the initial measure of control is to be submitted to the Administrator within 30 days of the effective date. For a new source, any request for using an equivalent method is to be submitted to the Administrator with the application for approval of construction or modification required by § 61.07.

§ 61.67 Emission tests.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator of a source to which this subpart applies shall test emissions from the source,

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date, or

(2) Within 90 days of startup in the case of a new source, initial startup of which occurs after the effective date.

(b) The owner or operator shall provide the Administrator at least 30 days prior notice of an emission test to afford the Administrator the opportunity to have an observer present during the test.

(c) Any emission test is to be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated and under other relevant conditions as may be specified by the Administrator based on representative performance of the source.

(d) [Reserved][38]

(e) When at all possible, each sample is to be analyzed within 24 hours, but in no case in excess of 72 hours of sample collection. Vinyl chloride emissions are to be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.[38]

(f) The owner or operator shall retain at the plant and make available, upon request, for inspection by the Administrator, for a minimum of 2 years records of emission test results and other data needed to determine emissions.

(g) Unless otherwise specified, the owner or operator shall use test Test Methods in Appendix B to this part for each test as required by paragraphs (g)(1), (g)(2), (g)(3), (g)(4), and (g)(5) of this section, unless an equivalent method or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) Test Method 106 is to be used to determine the vinyl chloride emissions from any source for which an emission limit is prescribed in §§ 61.62(a) or (b) § 61.63(a), or §§ 61.64(a)(1), (b), (c), or (d), or from any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted is § 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii).

(i) For each run, one sample is to be collected. The sampling site is to be at least two stack or duct diameters downstream and one half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. For a rectangular cross section an equivalent diameter is to be determined from the following equation:

$$\text{equivalent diameter} = 2\frac{(\text{length})\ (\text{width})}{\text{length} + \text{width}}$$

The sampling point in the duct is to be at the centroid of the cross section. The sample is to be extracted at a rate proportional to the gas velocity at the sampling point. The sample is to be taken over a minimum of one hour, and is to contain a minimum volume of 50 liters corrected to standard conditions.

(ii) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The average is to be computed on a time weighted basis.[38]

(iii) For gas streams containing more than 10 percent oxygen the concentration of vinyl chloride as determined by Test Method 106 is to be corrected to 10 percent oxygen (dry basis) for determination of emissions by using the following equation:

$$C_{b\,(\text{corrected})} = C_b \frac{10.9}{20.9 - \text{percent } O_2}$$

where:

$C_{b(\text{corrected})}$ = The concentration of vinyl chloride in the exhaust gases, corrected to 10-percent oxygen.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
20.9 = Percent oxygen in the ambient air at standard conditions.
10.9 = Percent oxygen in the ambient air at standard conditions, minus the 10.0-percent oxygen to which the correction is being made.
Percent O_2 = Percent oxygen in the exhaust gas as measured by Reference Method 3 in Appendix A of Part 60 of this chapter.[38]

(iv) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions in kg/100 kg product are to be determined by using the following equation:

$$C_{BX} = \frac{[C_b (2.60)\, Q\, 10^{-6}]\ [100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
2.60 = Density of vinyl chloride at one atmosphere and 20° C in kg/m ^{3}.
Q = Volumetric flow rate in m ^{3}/hr as determined by Reference Method 2 of Appendix A to Part 60 of this chapter.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr).[38]

(2) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream for which an emission limit is prescribed in § 61.65(b)(9)(i).

(3) Where a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined using Test Method 107 as follows:

(i) The number of strippers and samples and the types and grades of resin to be sampled are to be determined by the Administrator for each individual plant at the time of the test based on the plant's operation.

(ii) Each sample is to be taken immediately following the stripping operation.

(iii) The corresponding quantity of material processed by each stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraph (g)(3)(i) of this section.

(4) Where control technology other than or in addition to a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined as follows:

(i) Test Method 106 is to be used to determine atmospheric emissions from all of the process equipment simultaneously. The requirements of paragraph (g)(1) of this section are to be met.

(ii) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream subject to the emission limit prescribed in § 61.64(e). The mass of vinyl chloride in kg/100 kg product in each in process wastewater stream is to be determined by using the following equation:

$$C_{BX} = \frac{[C_d\, R\, 10^{-6}]\ [100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.
C_d = the concentration of vinyl chloride as measured by Test Method 107.
R = water flow rate in 1/hr, determined in accordance with a method which has been submitted to and approved by the Administrator.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr), determined in accordance with a method which has been submitted and approved by the Administrator.

(5) The reactor opening loss for which an emission limit is prescribed in § 61.64 (a)(2) is to be determined. The number of reactors for which the determination

is to be made is to be specified by the Administrator for each individual plant at the time of the determination based on the plant's operation. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

(i) Except as provided in paragraph (g)(5)(ii) of this section. the reactor opening loss is to be determined using the following equation:

$$C=\frac{W\,(2.60)\,(10^{-6})\,(Cb)}{YZ}$$

where:

C=kg vinyl chloride emissions/kg product.
W=Capacity of the reactor in m³.
2.60=Density of vinyl chloride at one atmosphere and 20° C in kg/m³.
10^{-6}=Conversion factor for ppm.
Cb=ppm by volume vinyl chloride as determined by Test Method 106 or a portable hydrocarbon detector which measures hydrocarbons with a sensitivity of at least 10 ppm.
Y=Number of batches since the reactor was last opened to the atmosphere.
Z=Average kg of polyvinyl chloride produced per batch in the number of batches since the reactor was last opened to the atmosphere.

(A) If Method 106 is used to determine the concentration of vinyl chloride (Cb), the sample is to be withdrawn at a constant rate with a probe of sufficient length to reach the vessel bottom from the manhole. Samples are to be taken for 5 minutes within 6 inches of the vessel bottom, 5 minutes near the vessel center, and 5 minutes near the vessel top.

(B) If a portable hydrocarbon detector is used to determine the concentration of vinyl chloride (Cb), a probe of sufficient length to reach the vessel bottom from the manhole is to be used to make the measurements. One measurement will be made within 6 inches of the vessel bottom, one near the vessel center and one near the vessel top. Measurements are to be made at each location until the reading is stabilized. All hydrocarbons measured are to be assumed to be vinyl chloride.

(C) The production rate of polyvinyl chloride (Z) is to be determined by a method submitted to and approved by the Administrator.

(ii) A calculation based on the number of evacuations, the vacuum involved, and the volume of gas in the reactor is hereby approved by the Administrator as an alternative method for determining reactor opening loss for postpolymerization reactors in the manufacture of bulk resins.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). [40,47]

§ 61.68 Emission monitoring.

(a) A vinyl chloride monitoring system is to be used to monitor on a continuous basis the emissions from the sources for which emission limits are prescribed in § 61.62(a) and (b), § 61.63(a), and § 61.64(a)(1), (b), (c), and (d), and for any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in § 61.65 (b)(1)(ii), and (b)(2), (b)(5), (b)(6)(ii), and (b)(9)(ii).[30]

(b) The vinyl chloride monitoring system(s) used to meet the requirement in paragraph (a) of this section is to be a device which obtains air sampels from one or more points on a continuous sequential basis and analyzes the samples with gas chromotography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry, flame ion detection, or an equivalent or alternative method. The vinyl chloride monitoring system used to meet the requirements in § 61.65(b)(8)(i) may be used to meet the requirements of this section.

(c) A daily span check is to be conducted for each vinyl chloride monitoring system used. For all of the emission sources listed in paragraph (a) of this section, except the one for which an emission limit is prescribed in § 61.62(b), the daily span check is to be concducted with a concentration of vinyl chloride equal to 10 ppm. For the emission source for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by § 61.67. The calibration is to be done with either:

(1) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.2 of Test Method 106 and in accordance with section 7.1 of Test Method 106, or[38]

(2) A calibration gas cylinder standard containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard is to have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in section 7.3 of Test Method 106. The requirements in sections 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards are to be followed.[38]

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). [40,47]

§ 61.69 Initial report.

(a) An owner or operator of any source to which this subpart applies shall submit a statement in writing notifying the Administrator that the equipment and procedural specifications in § 61.65 (b)(1), (b)(2), (b)(3), (b)(4), (b)(5), (b)(6), (b)(7), and (b)(8) are being implemented.

(b)(1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the effective date, unless a waiver of compliance is granted under § 61.11, along with the information required under § 61.10. If a waiver of compliance is granted, the statement is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the initial startup date.

(c) The statement is to contain the following information:

(1) A list of the equipment installed for compliance,

(2) A description of the physical and functional characteristics of each piece of equipment.

(3) A description of the methods which have been incorporated into the standard operating procedures for measuring or calculating the emissions for which emission limits are prescribed in § 61.65 (b)(1)(i) and (b)(6)(i),

(4) A statement that each piece of equipment is installed and that each piece of equipment and each procedure is being used.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). [40,47]

§ 61.70 Semiannual report.

(a) The owner or operator of any source to which this subpart applies shall submit to the Administrator on September 15 and March 15 of each year a report in writing containing the information required by this section. The first semiannual report is to be submitted following the first full 6 month reporting period after the initial report is submitted.[30]

(b)(1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the effective date, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the first report is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the initial startup date.

(c) Unless otherwise specified, the owner or operator shall use the Test Methods in Appendix B to this part to conduct emission tests as required by paragraphs (c)(2) and (c)(3) of this section, unless an equivalent or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) The owner or operator shall include in the report a record of any emissions which averaged over any hour period (commencing on the hour) are in excess of the emission limits prescribed in §§ 61.62(a) or (b), § 61.63(a), or § 61.64(a)(1), (b), (c), or (d), or for any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in § 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii). The emissions are to be measured in accordance with § 61.68.

(2) In polyvinyl chloride plants for which a stripping operation is used to attain the emission level prescribed in § 61.64(e), the owner or operator shall include in the report a record of the vinyl chloride content in the polyvinyl chloride resin. Test Method 107 is to be used to determine vinyl chloride content as follows:

(i) If batch stripping is used, one representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping operation, and identified by resin type and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.[38]

(ii) If continuous stripping is used, one representative sample of polyvinyl chloride resin is to be taken for each grade of resin processed or at intervals of 8 hours for each grade of resin which is being processed, whichever is more frequent. The sample is to be taken as the resin flows out of the stripper and identified by resin type and grade and the date and time the sample was taken. The corresponding quantity of material processed by each stripper over the time period represented by the sample during the eight hour period, is to be recorded and identified by resin type and grade and the date and time it represents.

(iii) The quantity of material processed by the stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section.

(v) The report to the Administrator by the owner or operator is to include the vinyl chloride content found in each sample required by paragraphs (c)(2)(i) and (c)(2)(ii) of this section, averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper(s) that calendar day, according to the following equation:

$$A_{T_i} = \frac{\sum_{i=1}^{n} P_{G_i} M_{G_i}}{Q_{T_i}} = \frac{P_{G_1} M_{G_1} + P_{G_2} M_{G_2} + \cdots + P_{G_n} M_{G_n}}{Q_{T_i}}$$

where:

A = 24-hour average concentration of type, T_i resin in ppm (dry weight basis).

Q = Total production of type T_i resin over the 24-hour period, in kg.

T_i = Type of resin; $i = 1, 2 \ldots m$ where m is total number of resin types produced during the 24-hour period.

M = Concentration of vinyl chloride in one sample of grade G_i resin, in ppm.

P = Production of grade G_i resin represented by the sample, in kg.

G_i = Grade of resin; e.g., G_1, G_2, and G_3.

n = Total number of grades of resin produced during the 24-hour period.[38]

(vi) The owner or operator shall retain at the source and make available for inspection by the Administrator for a minimum of 2 years records of all data needed to furnish the information required by paragraph (c)(2)(v) of this section: The records are to contain the following information:

(A) The vinyl chloride content found in all the samples required in paragraphs (c)(2)(i) and (c)(2)(ii) of this section, identified by the resin type and grade and the time and date of the sample, and

(B) The corresponding quantity of polyvinyl chloride resin processed by the stripper(s), identified by the resin type and grade and the time and date it represents.

(3) The owner or operator shall include in the report a record of the emissions from each reactor opening for which an emission limit is prescribed in § 61.64(a)(2). Emissions are to be determined in accordance with § 61.67(g)(5), except that emissions for each reactor are to be determined. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

§ 61.71 Recordkeeping.

(a) The owner or operator of any source to which this subpart applies shall retain the following information at the source and make it available for inspection by the Administrator for a minimum of two years:

(1) A record of the leaks detected by the vinyl chloride monitoring system, as required by § 61.65(b)(8), including the concentrations of vinyl chloride measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by § 61.65(b)(8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak, and any action taken to eliminate that leak.[38]

(3) A record of emissions measured in accordance with § 61.68.[38]

(4) A daily operating record for each polyvinyl chloride reactor, including pressures and temperatures.[38]

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

38 FR 8826, 4/6/73 (1)

as amended

41 FR 46560, 10/21/76 (28)
41 FR 53017, 12/3/76 (30)
42 FR 29005, 6/7/77 (38)
42 FR 41424, 8/17/77 (40)
43 FR 8800, 3/3/78 (47)

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

I. SOURCE REPORT

INSTRUCTIONS: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate U.S. Environmental Protection Agency Regional Office prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

A list of regional offices is provided in §61.04. ____________

A. SOURCE INFORMATION

1. Identification/Location - Indicate the name and address of each source.

1 2 Region   3 4 State   5 8 County   9 13 Source Number   0 0 0 14 16   0 0 17 18   1 19
20 22 AQCR #   23 26 City Code   27 Source Name 46
47 Street Address (Location of Plant) 66   80
Dup 1-18   19   20 City Name 34   State 35 39
40 State Regis. Number 54   55 58 NEDS X Ref.
59 SIC 62   FF 64   8 A/P 65   77 79 Staff   80
Dup 1-18   5 19   CS 30   SIP 31   EC 49   80

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

Dup 1-18   4 1 19 20   21 Name 43
44 46 Area Code   47 Number 54   80

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant" or "Machine Shop").

Dup 1-18   4 2 19 20   21 Description 50
51 Continued 79   80

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

Dup 1-18   4 3 19 20   21 Number Street or Box Number 45   80
Dup 1-18   4 4 19 20   21 City 35   37 38 State   41 Zip 44 80

5. Compliance Status - The emissions from this source ___ can ___ cannot meet the emission limitations contained in the National Emission Standards on or prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

Signature of Owner, Operator or Other Responsible Official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement actions unless granted a waiver of compliance by the Administrator of the U.S. Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant. [Sources subject to 61.22(l) may omit number 4. below.]

Dup 1-13

0 0 5

14 16 17 18 19 20 SCC 27 28 29 30 31

NEDS X Ref LS SIP

1. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AB" for asbestos, "BE" for beryllium, or "HG" for mercury.

32 33 Pollutant

34 Regulation 48 49 EC

2. Process Description - Provide a brief description of each process (e.g., "hydrogen end box" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

50 Process Description 74 80

Dup 1-18 6 1 19 20 21 50

51 79 80

Dup 1-18 6 2 19 20 21 50

51 79 80

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in Item 1 which enters the process in pounds per month (based on the previous twelve months of operation).

Dup 1-18 6 3 19 20

21 27

lbs./mo. 29 36 80

4. Control Devices

a. Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.

Dup 1-18 6 4 19 20 PRIMARY CONTROL DEVICE: 21 43

45 Primary Device Name 64

66 70 Percent Removal Efficiency

72 79

80

Dup 1-18 6 5 19 20 SECONDARY CONTROL DEVICES: 21 45

47 Secondary Device Name 64

66 70 Percent Removal Efficiency

% EFFIC. 72 79 80

b. Asbestos Emission Control Devices Only

i. If a baghouse is specified in Item 4a, give the following information:

- The air flow permeability in cubic feet per minute per square foot of fabric area.

  Air flow permeability = __________ cfm/ft^2

- The pressure drop in inches water gauge across the filter at which the baghouse is operated.

  Operating pressure drop = __________ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is / / spun / / or not spun.

- If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

  Thickness = ________ inches Density = ________ oz/yd^2

ii. If a wet collection device is specified in Item 4a, give the designed unit contacting energy in inches water gauge.

- Unit contacting energy = ________ inches w.g.

C. DISPOSAL OF ASBESTOS-CONTAINING WASTES. Part C should be completed separately for each asbestos-containing waste generation operation arising from sources subject to §61.22(a), (c), (e), and (h).

Dup 1-13 14 16 17 18 (0 0) 19 (5) 20 SCC 27 28 29 NEDS X Ref 30 CS 31 SIP

32 33 (A B) Pollutant 34 Regulation 48 49 EC

1. Waste Generation - Provide a brief description of each process that generates asbestos-containing waste (e.g. disposal of control device wastes).

50 Process Description 79 80

2. Asbestos Concentration - Indicate the average percentage asbestos content of these materials.

Dup 1-18 19 20 (6 1) 21 ASBESTOS CONCENTRATION: 43 45 48

50 (%) 80

3. Amount of Wastes - Indicate the average weight of asbestos-containing wastes disposed of, measured in kg/day.

Dup 1-18 19 20 (6 2) 21 27 29 kg/day 34 80

4. Control Methods - Indicate the emission control methods used in all stages of waste disposal, from collection, processing, and packaging to transporting and deposition.

Dup 1-18 19 20 (6 3) 21 Primary Control Method 43

45 79 80

Dup 1-18 19 20 (6 4) 21 50

51 79 80

5. Waste Disposal - Indicate the type of disposal site (sanitary landfill, open, covered) or incineration site (municipal, private) where the waste is disposed of and who operates the site (company, private, municipal). State the name and location of the site (closest city or town, county, state).

Dup 1-18 19 20 (6 5) 21 TYPE OF SITE: 33 35 50

51 79 80

Dup 1-18 19 20 (6 6) 21 OPERATOR: 29 31 50

51 79 80

Dup 1-18 19 20 (6 7) 21 LOCATION: 29

31 70

71 79 80

D. WASTE DISPOSAL SITES. Part D should be completed separately for each asbestos waste disposal site subject to section 61.22(1).

Dup 1-13 14–16 0 0 17–18 5 19 20 SCC 27 28–29 MEDS X Ref 30 CS 31 SIP

A B 32–33 Pollutant 34 Regulation 48 49 EC

50 WASTE DISPOSAL SITE 68 80

1. Description - Provide a brief description of the site, including its size and configuration, and the distance to the closest city or town, closest residence, and closest primary road.

Dup 1-18 6 1 19–20 21 SITE DESCRIPTION 37 39 50

51 79 80

Dup 1-18 6 2 19–20 21 DISTANCE: 29 30 TOWN: 34 36 40 K M 42–43

45 RESIDENCE: 54 56 60 K M 62–63 65 ROAD: 69 71 75

K M 77–78 80

2. Inactivation - After the site is inactivated, indicate the method or methods used to comply with the standard and send a list of the actions that will be undertaken to maintain the inactivated site.

Dup 1-18 6 8 19–20 21 COMPLIANCE METHOD/INACTIVE SITE: 52

54 79 80

II. WAIVER REQUESTS

A. WAIVER OF COMPLIANCE. Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants prior to 90 days after the effective date of any standards or amendments which require the submission of such information may request a waiver of compliance from the Administrator of the U.S. Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the hazardous pollutant standards, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

The report information provided in Section I must accompany this application. Applications should be sent to the appropriate EPA regional office.

1. Processes Involved - Indicate the process or processes emitting hazardous pollutants to which emission controls are to be applied.

2. Controls

   a. Describe the proposed type of control device to be added or modification to be made to the process to reduce the emissions of hazardous pollutants to an acceptable level. (Use additional sheets if necessary.)

   b. Describe the measures that will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment. (Use additional sheets if necessary.)

3. Increments of Progress - Specify the dates by which the following increments of progress will be met.

   - Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of the component parts to accomplish emission control or process modification.

Dup 1-16 0 1 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

   - Date of initiation of on-site construction or installation of emission control equipment or process change.

Dup 1-16 0 2 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

   - Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

Dup 1-16 0 3 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

   - Date by which final compliance is to be achieved.

Dup 1-16 0 4 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

B. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the report information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source are within the prescribed limits, documentation of this condition must be attached.

Date

Signature of the owner or operator

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)). 40,47

Method 101—Determination of Particulate and Gaseous Mercury Emissions From Chlor-Alkali Plants—Air Streams[66]

1. *Applicability and Principle*—1.1 *Applicability.* This method applies to the determination of particulate and gaseous mercury (Hg) emissions from chlor-alkali plants and other sources (as specified in the regulations), where the carrier-gas stream in the duct or stack is principally air.

1.2 *Principle.* Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic iodine monochloride (ICl) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry.

2. *Range and Sensitivity*—2.1 *Range.* After initial dilution, the range of this method is 0.5 to 120 μg Hg/ml. The upper limit can be extended by further dilution of the sample.

2.2 *Sensitivity.* The sensitivity of this method depends on the recorder/spectrophotometer combination selected.

3. *Interfering Agents*—3.1 *Sampling.* SO_2 reduces ICl and causes premature depletion of the ICl solution.

3.2 *Analysis.* ICl concentrations greater than 10^{-4} molar inhibit the reduction of the Hg (II) ion in the aeration cell. Condensation of water vapor on the optical cell windows causes a positive interference.

4. *Precision and Accuracy*—The following estimates are based on collaborative tests, wherein 13 laboratories performed duplicate analyses on two Hg-containing samples from a chlor-alkali plant and on one laboratory-prepared sample of known Hg concentration. The concentration ranged from 2 to 65 μg Hg/ml.

4.1 *Precision.* The estimated within-laboratory and between-laboratory standard deviations are 1.6 and 1.8 μg Hg/ml, respectively.

4.2 *Accuracy.* The participating laboratories that analyzed a 64.3-μg Hg/ml (in 0.1 M ICl) standard obtained a mean of 63.7 μg Hg/ml.

5. *Apparatus*—5.1 *Sampling Train.* A schematic of the sampling train is shown in Figure 101–1; it is similar to the Method 5 train (mention of Method 5 refers to Parts 60 of 40 CFR). The sampling train consists of the following components:

5.1.1 *Probe Nozzle, Pitot Tube, Differential Pressure Gauge, Metering System, Barometer, and Gas Density Determination Equipment.* Same as Method 5, Sections 2.1.1, 2.1.3, 2.1.4, 2.1.8, 2.1.9, and 2.1.10, respectively.

5.1.2 *Probe Liner.* Borosilicate or quartz glass tubing. The tester may use a heating system capable of maintaining a gas temperature of 120±14° C (248±25° F) at the probe exit during sampling to prevent water condensation.

Note.—Do not use metal probe liners.

5.1.3 *Impingers.* Four Greenburg-Smith impingers connected in series with leak-free ground glass fittings or any similar leak-free noncontaminating fittings. For the first, third, and fourth impingers, the tester may use impingers that are modified by replacing the tip with a 13-mm-ID (0.5-in.) glass tube extending to 13 mm (0.5 in.) from the bottom of the flask.

5.1.4 *Acid Trap.* Mine Safety Appliances air line filter, Catalog number 81857, with acid absorbing cartridge and suitable connections, or equivalent.

5.2 *Sample Recovery.* The following items are needed:

5.2.1 *Glass Sample Bottles.* Leakless, with Teflon-lined caps, 1000- and 100-ml.

5.2.2 *Graduated Cylinder.* 250-ml.

5.2.3 *Funnel and Rubber Policeman.* To aid in transfer of silica gel to container; not necessary if silica gel is weighed in the field.

5.2.4 *Funnel.* Glass, to aid in sample recovery.

5.3 *Sample Preparation and Analysis.* The following equipment is needed:

5.3.1 *Atomic Absorption Spectrophotometer.* Perkin-Elmer 303, or equivalent, containing a hollow-cathode mercury lamp and the optical cell described in Section 5.3.2.

5.3.2 *Optical Cell.* Cylindrical shape with quartz end windows and having the dimensions shown in Figure 101–2. Wind the cell with approximately 2 meters of 24-gauge nichrome heating wire, and wrap with fiberglass insulation tape or equivalent; do not let the wires touch each other.

5.3.3 *Aeration Cell.* Constructed according to the specifications in Figure 101–3. Do not use a glass frit as a substitute for the blown glass bubbler tip shown in Figure 101–3.

5.3.4 *Recorder.* Matched to output of the spectrophotometer described in Section 5.3.1.

5.3.5 *Variable Transformer.* To vary the voltage on the optical cell from 0 to 40 volts.

5.3.6 *Hood.* For venting optical cell exhaust.

5.3.7 *Flowmetering Valve.*

5.3.8 *Flowmeter.* Rotameter or equivalent, capable of measuring a gas flow of 1.5 liters/min.

5.3.9 *Aeration Gas Cylinder.* Nitrogen or dry, Hg-free air, equipped with a single-stage regulator.

5.3.10 *Connecting Tubing.* Use glass tubing (ungreased ball- and socket-connections are recommended) for all tubing connections between the solution cell and the optical cell; do not use Tygon tubing, other types of flexible tubing, or metal tubing as substitutes. The tester may use Teflon, steel, or copper tubing between the nitrogen tank and flowmetering valve (5.3.7), and Tygon, gum, or rubber tubing between the flowmetering valve and the aeration cell.

5.3.11 *Flow Rate Calibration Equipment.* Bubble flowmeter or wet test meter for measuring a gas flow rate of 1.5±0.1 liters/min.

5.3.12 *Volumetric Flasks.* Class A with penny head standard taper stoppers; 100-, 250-, 500- and 1000-ml.

5.3.13 *Volumetric Pipets.* Class A; 1-, 2-, 3-, 4-, and 5-ml.

5.3.14 *Graduated Cylinder.* 50-ml.

5.3.15 *Magentic Stirrer.* General-purpose laboratory type.

5.3.16 *Magnetic Stirring Bar.* Teflon-coated.

5.3.17 *Balance.* Capable of weighing to ±0.5 g.

5.4 *Alternative Analytical Apparatus.* Alternative systems are allowable as long as they meet the following criteria:

5.4.1 A linear calibration curve is generated and two consecutive samples of the same aliquot size and concentration agree within 3 percent of their average.

5.4.2 A minimum of 95 percent of the spike is recovered when an aliquot of a source sample is spiked with a known concentration of mercury (II) compound.

5.4.3 The reducing agent should be added after the aeration cell is closed.

5.4.4 The aeration bottle bubbler should not contain a frit.

5.4.5 Any Tygon used should be as short as possible and conditioned prior to use until blanks and standards yield linear and reproducible results.

5.4.6 If manual stirring is done before aeration, it should be done with the aeration cell closed.

5.4.7 A drying tube should not be used unless it is conditioned as the Tygon above.

6. *Reagents*—Use ACS reagent-grade chemicals or equivalent, unless otherwise specified.

6.1 *Sampling and Recovery.* The reagents used in sampling and recovery are as follows:

6.1.1 *Water.* Deionized distilled, meeting ASTM Specifications for Type I Reagent Water—ASTM Test Method D 1193–74. If high concentrations of organic matter are not expected to be present, the analyst may eliminate the $KMnO_4$ test for oxidizable organic matter. Use this water in all dilutions and solution preparations.

6.1.2 *Nitric Acid (HNO_3), 50 Percent (V/V).* Mix equal volumes of concentrated HNO_3 and deionized distilled water, being careful to slowly add the acid to the water.

6.1.3 *Silica Gel.* Indicating type, 6- to 16-mesh. If previously used, dry at 175° C (350° F) for 2 hours. The tester may use new silica gel as received.

6.1.4 *Potassium Iodide (KI) Solution, 25 Percent.* Dissolve 250 g of KI in deionized distilled water and dilute to 1 liter.

6.1.5 *Iodine Monochloride (ICl) Stock Solution, 1.0 M.* To 800 ml of 25 percent KI solution, add 800 ml of concentrated hydrochloric acid (HCl). Cool to room temperature. With vigorous stirring, slowly add 135 g of potassium iodate (KIO_3) and stir until all free iodine has dissolved. A clear orange-red solution occurs when all the KIO_3 has been added. Cool to room temperature and dilute to 1800 ml with deionized distilled water. Keep the solution in amber glass bottles to prevent degradation.

6.1.6 *Absorbing Solution, 0.1 M ICl.* Dilute 100 ml of the 1.0 M ICl stock solution to 1 liter with deionized distilled water. Keep the solution in amber glass bottles and in darkness to prevent degradation. This reagent is stable for at least 2 months.

6.2 *Sample Preparation and Analysis.* The reagents needed are listed below:

6.2.1 *Tin (II) Solution.* Prepare fresh daily and keep sealed when not being used.

Completely dissolve 20 g of tin (II) chloride [or 25 g of tin (II) sulfate] crystals (Baker Analyzed reagent grade or any other brand that will give a clear solution) in 25 ml of concentrated HCl. Dilute to 250 ml with deionized distilled water. Do not substitute HNO_3, H_2SO_4, or other strong acids for the HCl.

6.2.2 *Mercury Stock Solution, 1 mg Hg/ml.* Prepare and store all mercury standard solutions in borosilicate glass containers. Completely dissolve 0.1354 g of mercury (II) chloride in 75 ml of deionized distilled water in a 100 ml glass volumetric flask. Add 10 ml of concentrated HNO_3, and adjust the volume to exactly 100 ml with deionized distilled water. Mix thoroughly. This solution is stable for at least 1 month.

6.2.3 *Sulfuric Acid, 5 Percent (V/V).* Dilute 25 ml of concentrated H_2SO_4 to 500 ml with deionized distilled water.

6.2.4 *Intermediate Mercury Standard Solution, 10 μg Hg/ml.* Prepare fresh weekly. Pipet 5.0 ml of the mercury stock solution (6.2.2) into a 500-ml glass volumetric flask and add 20 ml of the 5 percent H_2SO_4 solution. Dilute to exactly 500 ml with deionized distilled water. Thoroughly mix the solution.

6.2.5 *Working Mercury Standard Solution, 200 ng Hg/ml.* Prepare fresh daily. Pipet 5.0 ml from the "Intermediate Mercury Standard Solution" (6.2.4) into a 250-ml volumetric glass flask. Add 10 ml of the 5 percent H_2SO_4 and 2 ml of the 0.1 M ICl absorbing solution taken as a blank (7.2.3) and dilute to 250 ml with deionized distilled water. Mix thoroughly.

7. *Procedure*—7.1 *Sampling.* Because of the complexity of this method, testers should be trained and experienced with the test procedures to assure reliable results. Since the amount of Hg that is collected generally is small, the method must be carefully applied to prevent contamination or loss of sample.

7.1.1 *Pretest Preparation.* Follow the general procedure given in Method 5, Section 4.1.1, except omit the directions on the filter.

7.1.2 *Preliminary Determinations.* Follow the general procedure given in Method 5, Section 4.1.2, except as follows: Select a nozzle size based on the range of velocity heads to assure that it is not necessary to change the nozzle size in order to maintain isokinetic sampling rates below 28 liters/min (1.0 cfm).

Obtain samples over a period or periods that accurately determine the maximum emissions that occur in a 24-hour period. In the case of cyclic operations, run sufficient tests for the accurate determination of the emissions that occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high Hg or high SO_2 concentrations make it impossible to sample for the desired minimum time. This is indicated by reddening (liberation of free iodine) in the first impinger. In these cases, the tester may divide the sample run into two or more subruns to insure that the absorbing solution is not depleted.

7.1.3 *Preparation of Sampling Train.* Clean all glassware [probe, impingers, and connectors] by rinsing with 50 percent HNO_3, tap water, 0.1 M ICl, tap water, and finally deionized distilled water. Place 100 ml of 0.1 M ICl in each of the first three impingers. Take care to prevent the absorbing solution from contacting any greased surfaces. Place approximately 200 g of preweighed silica gel in the fourth impinger. The tester may use more silica gel, but should be careful to ensure that it is not entrained and carried out from the impinger during sampling. Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, determine and record the weight of the silica gel plus impinger to the nearest 0.5 g.

Install the selected nozzle using a Viton A O-ring when stack temperatures are less than 260° C (500° F). Use a fiberglass string gasket if temperatures are higher. See APTD–0576 (Citation 9 in Section 10) for details. Other connecting systems using either 316 stainless steel or Teflon ferrules may be used. Mark the probe with heat-resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point. Assemble the train as shown in Figure 101–1, using (if necessary) a very light coat of silicone grease on all ground glass joints. Grease only the outer portion (see APTD–0576) to avoid possibility of contamination by the silicone grease.

Note.—An empty impinger may be inserted between the third impinger and the silica gel to remove excess moisture from the sample stream.

After the sampling train has been assembled, turn on and set the probe, if applicable, at the desired operating temperature. Allow time for the temperatures to stabilize. Place crushed ice around the impingers.

7.1.4 *Leak-Check Procedures.* Follow the leak-check procedures outlined in Method 5, Sections 4.1.4.1 (Pretest Leak Check), 4.1.4.2 (Leak Checks During Sample Run), and 4.1.4.3 (Post-Test Leak Check).

7.1.5 *Mercury Train Operation.* Follow the general procedure given in Method 5, Section 4.1.5. For each run, record the data required on a data sheet such as the one shown in Figure 101–4.

7.1.6 *Calculation of Percent Isokinetic.* Same as Method 5, Section 4.1.6.

7.2 *Sample Recovery.* Begin proper cleanup procedure as soon as the probe is removed from the stack at the end of the sampling period.

Allow the probe to cool. When it can be safely handled, wipe off any external particulate matter near the tip of the probe nozzle and place a cap over it. Do not cap off the probe tip tightly while the sampling train is cooling. Capping would create a vacuum and draw liquid out from the impingers.

Before moving the sampling train to the cleanup site, remove the probe from the train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the impinger. Use either ground-glass stoppers, plastic caps, or serum caps to close these openings.

Transfer the probe and impinger assembly to a cleanup area that is clean, protected from the wind, and free of Hg contamination. The ambient air in laboratories located in the immediate vicinity of Hg-using facilities is not normally free of Hg contamination.

Inspect the train before and during assembly, and note any abnormal conditions. Treat the sample as follows:

7.2.1 *Container No. 1* (Impinger and Probe). Using a graduated cylinder, measure the liquid in the first three impingers to within ±1 ml. Record the volume of liquid present (e.g., see Figure 5–3 of Method 5). This information is needed to calculate the moisture content of the effluent gas. (Use only glass storage bottles and graduated cylinders that have been precleaned as in Section 7.1.3.) Place the contents of the first three impingers into a 1000-ml glass sample bottle.

Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover the Hg (and any condensate) from the probe nozzle, probe fitting, and probe liner as follows: Rinse these components with two 50-ml portions of 0.1 M IC1. Next, rinse the probe nozzle, fitting and liner, and each piece of connecting glassware between the probe liner and the back half of the third impinger with a maximum of 400 ml of deionized distilled water. Add all washings to the 1000-ml glass sample bottle containing the liquid from the first three impingers.

After all washings have been collected in the sample container, tighten the lid on the container to prevent leakage during shipment to the laboratory. Mark the height of the liquid to determine later whether leakage occurred during transport. Label the container to clearly identify its contents.

7.2.2 *Container No. 2* (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal. The tester may use as aids a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. The small amount of particles that may adhere to the impinger wall need not be removed. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g; record this weight.

7.2.3 *Container No. 3* (Absorbing Solution Blank). For a blank, place 50 ml of the 0.1 M IC1 absorbing solution in a 100-ml sample bottle. Seal the container. Use this blank to prepare the working mercury standard solution (6.2.5).

7.3 *Sample Preparation.* Check the liquid level in each container to see whether liquid was lost during transport. If a noticeable amount of leakage occurred, either void the sample or use methods subject to the approval of the Administrator to account for the losses. Then follow the procedures below:

7.3.1 *Container No. 1* (Impinger and Probe). Carefully transfer the contents of Container No. 1 into a 1000-ml volumetric flask and adjust the volume to exactly 1000 ml with deionized distilled water.

7.3.2 *Dilutions.* Pipet a 2-ml aliquot from the diluted sample from 7.3.1 into a 250-ml volumetric flask. Add 10 ml of 5 percent H_2SO_4 and adjust the volume to exactly 250 ml with deionized distilled water. These solutions are stable for at least 72 hours.

Note.—The dilution factor will be 250/2 for this solution.

7.4 *Analysis.* Calibrate the spectrophotometer and recorder and prepare the calibration curve as described in Sections 8.1 to 8.4.

7.4.1 *Mercury Samples.* Repeat the procedure used to establish the calibration curve with appropriately sized aliquots (1 to 5 ml) of each of the diluted samples (from Section 7.3.2) until two consecutive peak heights agree within ±3 percent of their average value. The peak maximum of an aliquot (except the 5-ml aliquot) must be greater than 10 percent of the recorder full scale. If the peak maximum of a 1.0-ml aliquot is off scale on the recorder, further dilute the original source sample to bring the Hg concentration into the calibration range of the spectrophotometer.

Run a blank and standard at least after every five samples to check the spectrophotometer calibration; recalibrate as necessary.

It is also recommended that at least one sample from each stack test be checked by the method of standard additions to confirm that matrix effects have not interfered in the analysis.

7.4.2 *Container No. 2* (Silica Gel). Weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g using a balance. (This step may be conducted in the field.)

8. *Calibration and Standards*—Before use, clean all glassware, both new and used, as follows: brush with soap and water, liberally rinse with tap water, soak for 1 hour in 50 percent HNO_3, and then rinse with deionized distilled water.

8.1 *Flow Calibration.* Assemble the aeration system as shown in Figure 101–5. Set the outlet pressure on the aeration gas cylinder regulator to a minimum pressure of 500 mm Hg (10 psi), and use the flowmetering valve and a bubble flowmeter or wet test meter to obtain a flow rate of 1.5±0.1 liters/min through the aeration cell. After the flow calibration is complete, remove the bubble flowmeter from the system.

8.2 *Optical Cell Heating System Calibration.* Using a 50-ml graduated cylinder, add 50 ml of deionized distilled water to the bottle section of the aeration cell and attach the bottle section to the bubbler section of the cell. Attach the aeration cell to the optical cell; and while aerating at 1.5 liters/min, determine the minimum variable transformer setting necessary to prevent condensation of moisture in the optical cell and in the connecting tubing. (This setting should not exceed 20 volts.)

8.3 *Spectrophotometer and Recorder Calibration.* The mercury response may be measured by either peak height or peak area.

Note.—The temperature of the solution affects the rate at which elemental Hg is released from a solution and, consequently, it affects the shape of the absorption curve (area) and the point of maximum absorbance (peak height). Therefore, to obtain reproducible results, bring all solutions to room temperature before use.

Set the spectrophotometer wavelength at 253.7 nm, and make certain the optical cell is at the minimum temperature that will prevent water condensation. Then set the recorder scale as follows: Using a 50-ml graduated cylinder, add 50 ml of deionized distilled water to the aeration cell bottle and pipet 5.0 ml of the working mercury standard solution into the aeration cell.

Note.—Always add the Hg-containing solution to the aeration cell after the 50 ml of deionized distilled water.

Place a Teflon-coated stirring bar in the bottle. Before attaching the bottle section to the bubbler section of the aeration cell, make certain that (1) the aeration cell exit arm stopcock (Figure 101–3) is closed (so that Hg will not prematurely enter the optical cell when the reducing agent is being added) and (2) there is no flow through the bubbler. If conditions (1) and (2) are met, attach the bottle section to the bubbler section of the aeration cell through the side arm of the cell and immediately stopper the side arm. Stir the solution for 15 sec, turn on the recorder, open the aeration cell exit arm stopcock, and then immediately initiate aeration with continued stirring. Determine the maximum absorbance of the standard and set this value to read 90 percent of the recorder full scale.

8.4 *Calibration Curve.* After setting the recorder scale, repeat the procedure in Section 8.3 using 0.0-, 1.0-, 2.0-, 3.0-, 4.0-, and 5.0-ml aliquots of the working standard solution (final amount of Hg in the aeration cell is 0, 200, 400, 600, 800, and 1000 ng, respectively). Repeat this procedure on each aliquot size until two consecutive peaks agree within 3 percent of their average value. (Note: To prevent Hg carryover from one sample to another, do not close the aeration gas tank valve and do not disconnect the aeration cell from the optical cell until the recorder pen has returned to the baseline.) It should not be necessary to disconnect the aeration gas inlet line from the aeration cell when changing samples. After separating the bottle and bubbler sections of the aeration cell, place the bubbler section into a 600-ml beaker containing approximately 400 ml of deionized distilled water. Rinse the bottle section of the aeration cell with a stream of deionized distilled water to remove all traces of the tin (II) reducing agent. Also, to prevent the loss of Hg before aeration, remove all traces of the reducing agent between samples by washing with deionized distilled water. It will be necessary, however, to wash the aeration cell parts with concentrated HCl if any of the following conditions occur: (1) A white film appears on any inside surface of the aeration cell, (2) the calibration curve changes suddenly, or (3) the replicate samples do not yield reproducible results.

Subtract the average peak height (or peak area) of the blank (0.0-ml aliquot)—which should be less than 2 percent of recorder full scale—from the averaged peak heights of the 1.0-, 2.0-, 3.0-, 4.0-, and 5.0-ml aliquot standards. If the blank absorbance is greater than 2 percent of full-scale, the probable cause is Hg contamination of a reagent or carry-over of Hg from a previous sample. Plot the corrected peak height of each standard solution versus the corresponding final total Hg weight in the aeration cell (in ng) and draw the best-fit straight line. This line should either pass through the origin or pass through a point no further from the origin than ±2 percent of the recorder full scale. If the line does not pass through or very near to the origin, check for nonlinearity of the curve and for incorrectly prepared standards.

8.5 *Sampling Train Calibration.* Calibrate the sampling train components according to the procedures outlined in the following sections of Method 5: Section 5.1 (Probe Nozzle), Section 5.2 (Pitot Tube), Section 5.3 (Metering System), Section 5.4 (Probe Heater), Section 5.5 (Temperature Gauges), Section 5.7 (Barometer). Note that the leak-check described in Section 5.6 of Method 5 applies to this method.

9. *Calculations*—9.1 *Dry Gas Volume.* Using the data from this test, calculate $V_{m(std)}$, the dry gas sample volume at standard conditions (corrected for leakage, if necessary) as outlined in Section 6.3 of Method 5.

9.2 *Volume of Water Vapor and Moisture Content.* Using the data obtained from this test, calculate the volume of water vapor $V_{w(std)}$ and the moisture content B_{ws} of the stack gas. Use Equations 5–2 and 5–3 of Method 5.

9.3 *Stack Gas Velocity.* Using the data from this test and Equation 2–9 of Method 2, calculate the average stack gas velocity v_s.

9.4 *Total Mercury.* For each source sample, correct the average maximum absorbance of the two consecutive samples whose peak heights agree within ±3 percent of their average for the contribution of the solution blank (see Section 8.4). Use the calibration curve and these corrected averages, to determine the final total weight of mercury in nanograms in the aeration cell for each source sample. Correct for any dilutions made to bring the sample in the working range of the spectrophotometer. Then calculate the Hg in μg (m_{Hg}) in the original solution as follows:

$$m_{Hg} = \frac{C_{Hg(AC)}(D.F.)\ V_f\ 10^{-3}}{S} \qquad \text{Eq. 101–1}$$

Where:

$C_{Hg(AC)}$ = Total nanograms of mercury in aliquot analyzed (reagent blank subtracted).

D.F. = Dilution factor for the Hg-containing solution (before adding to the aeration cell; e.g., D.F. = 250/2 if the source samples were diluted as described in Section 7.3.2.)

V_f = Solution volume of original sample, 1000 ml for samples diluted as described in Section 7.2.1.

10^{-3} = Conversion factor, μg/ng.

S = Aliquot volume added to aeration cell, ml.

9.5 *Mercury Emission Rate.* Calculate the Hg emission rate R in g/day for continuous operations using Equation 101–2. For cyclic operations, use only the time per day each stack is in operation. The total Hg emission rate from a source will be the summation of results from all stacks.

$$R = K\ \frac{m_{Hg}\ v_s\ A_s\ (86{,}400 \times 10^{-6})}{[V_{m(std)} + V_{w(std)}](T_s/P_s)} \qquad \text{Eq. 101–2}$$

Where:

A_s = Stack cross-sectional area, m^2 (ft^2).

86,400 = Conversion factor, sec/day.
10^{-6} = Conversion factor, g/μg.
T_s = Absolute average stack gas temperature, °K (°R).
P_s = Absolute stack gas pressure, mm Hg (in. Hg).
K = 0.3858 °K/mm Hg for metric units.
= 17.65 °R/in. Hg for English units.

9.6 *Isokinetic Variation and Acceptable Results.* Same as Method 5, Sections 6.11 and 6.12, respectively.

9.7 *Determination of Compliance.* Each performance test consists of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, use the average of the results of all repetitions.

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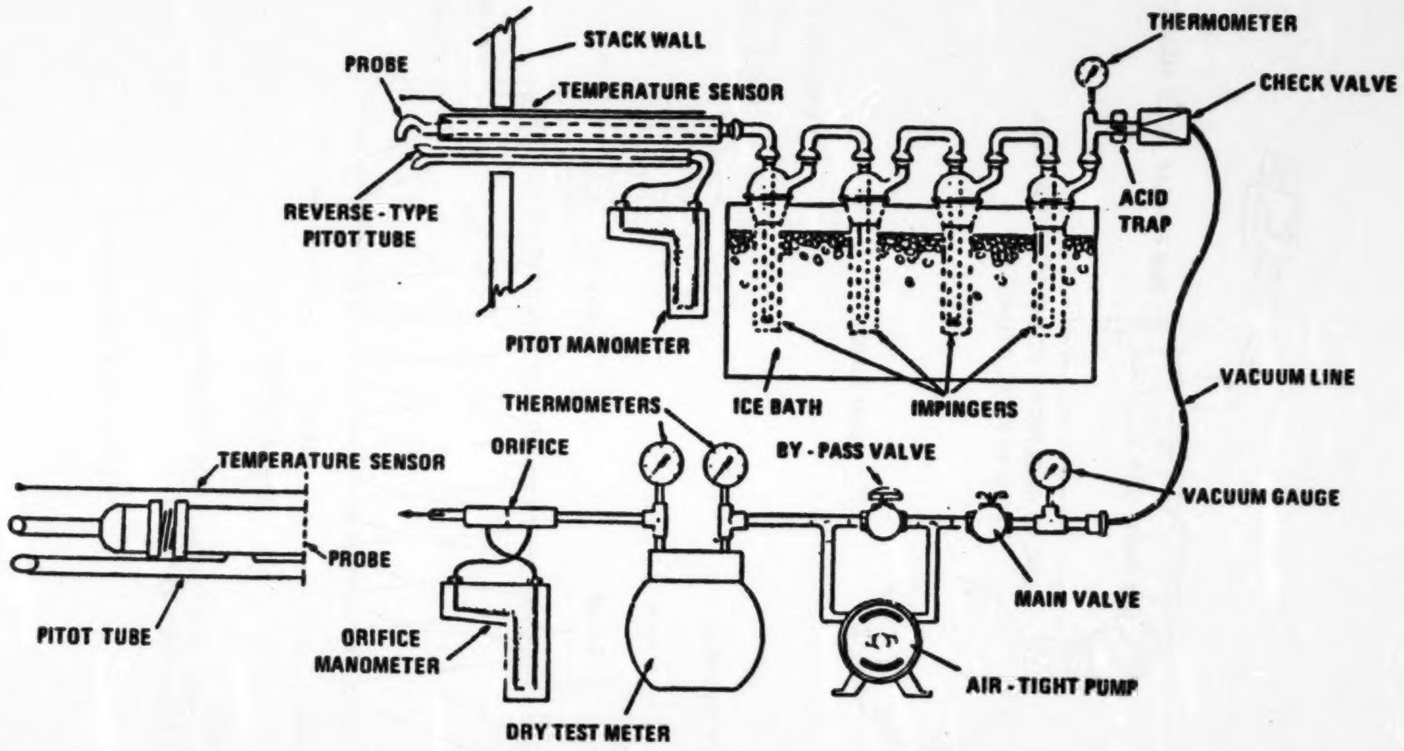
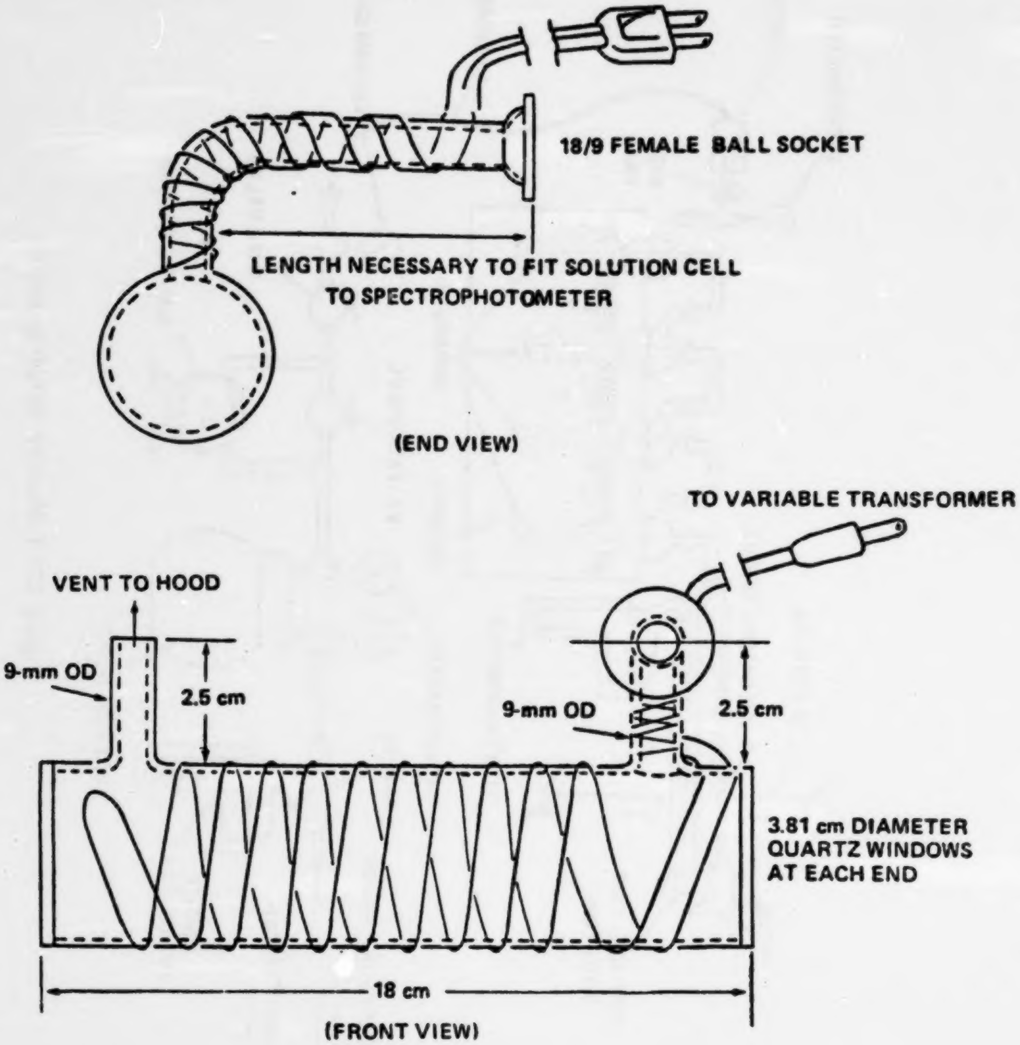

THERMOMETER
CHECK VALVE
STACK WALL
PROBE
TEMPERATURE SENSOR
ACID TRAP
REVERSE - TYPE PITOT TUBE
PITOT MANOMETER
VACUUM LINE
ICE BATH
IMPINGERS
THERMOMETERS
ORIFICE
BY - PASS VALVE
TEMPERATURE SENSOR
VACUUM GAUGE
PROBE
MAIN VALVE
PITOT TUBE
ORIFICE MANOMETER
AIR - TIGHT PUMP
DRY TEST METER

Figure 101-1 Mercury sampling train.


18/9 FEMALE BALL SOCKET
LENGTH NECESSARY TO FIT SOLUTION CELL TO SPECTROPHOTOMETER
(END VIEW)
TO VARIABLE TRANSFORMER
VENT TO HOOD
9-mm OD
2.5 cm
9-mm OD
2.5 cm
3.81 cm DIAMETER QUARTZ WINDOWS AT EACH END
18 cm
(FRONT VIEW)

NOTES:
CELL WOUND WITH 24-GAUGE NICHROME WIRE
TOLERANCES ± 5 PERCENT

Figure 101-2. Optical cell.

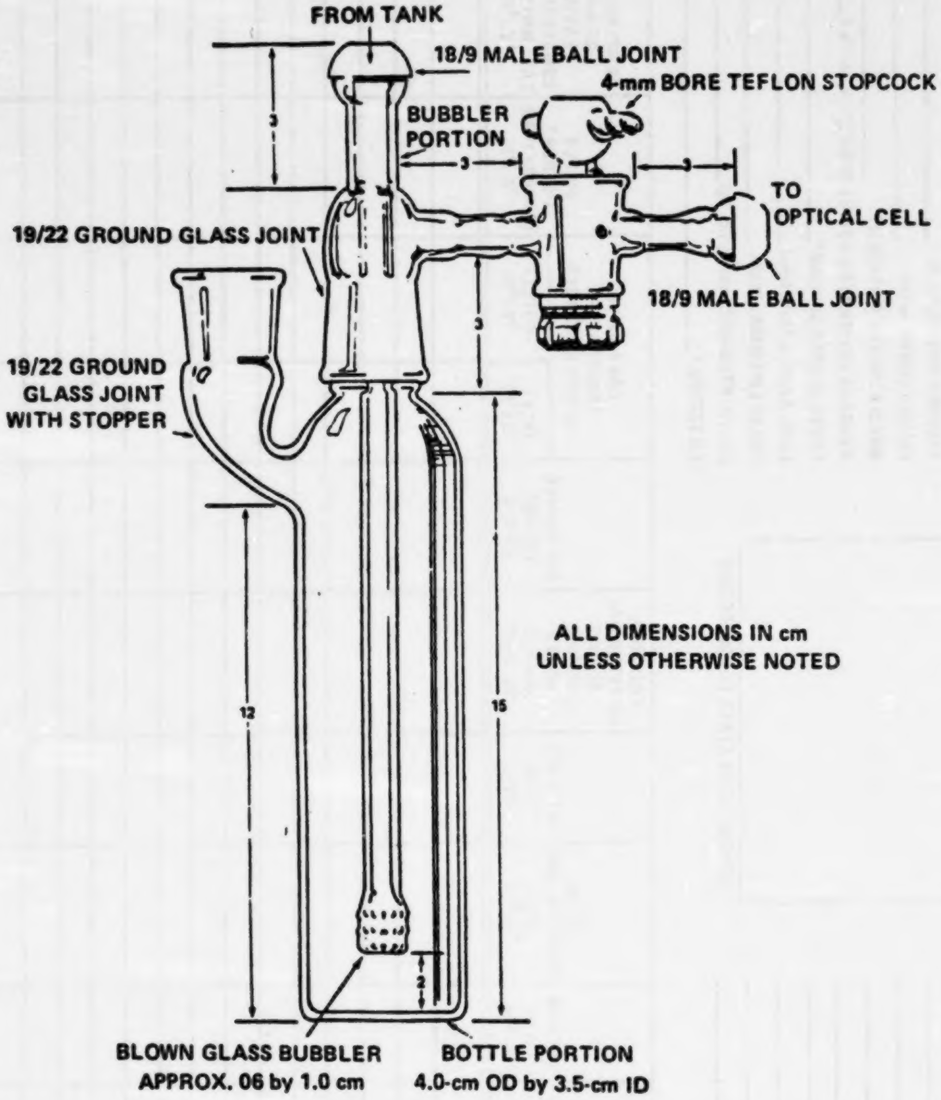

FROM TANK
18/9 MALE BALL JOINT
4-mm BORE TEFLON STOPCOCK
BUBBLER PORTION
3
3
3
TO OPTICAL CELL
19/22 GROUND GLASS JOINT
18/9 MALE BALL JOINT
3
19/22 GROUND GLASS JOINT WITH STOPPER
10
ALL DIMENSIONS IN cm UNLESS OTHERWISE NOTED
12
15
2
BLOWN GLASS BUBBLER APPROX. 06 by 1.0 cm
BOTTLE PORTION 4.0-cm OD by 3.5-cm ID

Figure 101-3. Aeration cell.

PLANT ______
LOCATION ______
OPERATOR ______
DATE ______
RUN NO. ______
SAMPLE BOX NO. ______
FILTER BOX NO. ______
METER ΔH@ ______
C FACTOR ______
PITOT TUBE COEFFICIENT, C_p ______

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE ______
BAROMETRIC PRESSURE ______
ASSUMED MOISTURE, % ______
PROBE LENGTH, m (ft) ______
NOZZLE IDENTIFICATION NO. ______
AVERAGE CALIBRATED NOZZLE DIAMETER, cm (in.) ______
PROBE HEATER SETTING* ______
LEAK RATE, m^3/min (cfm) ______
PROBE LINER MATERIAL ______
STATIC PRESSURE, mm Hg (in. Hg) ______
FILTER NO.* ______

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	VACUUM mm Hg (in. Hg)	STACK TEMPERATURE (T_S) °C (°F)	VELOCITY HEAD (ΔP_S)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER mm H_2O (in. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER		FILTER HOLDER* TEMPERATURE, °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, °C (°F)
							INLET °C (°F)	OUTLET °C (°F)		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

*IF APPLICABLE

Fig. 101-4. Mercury field data.

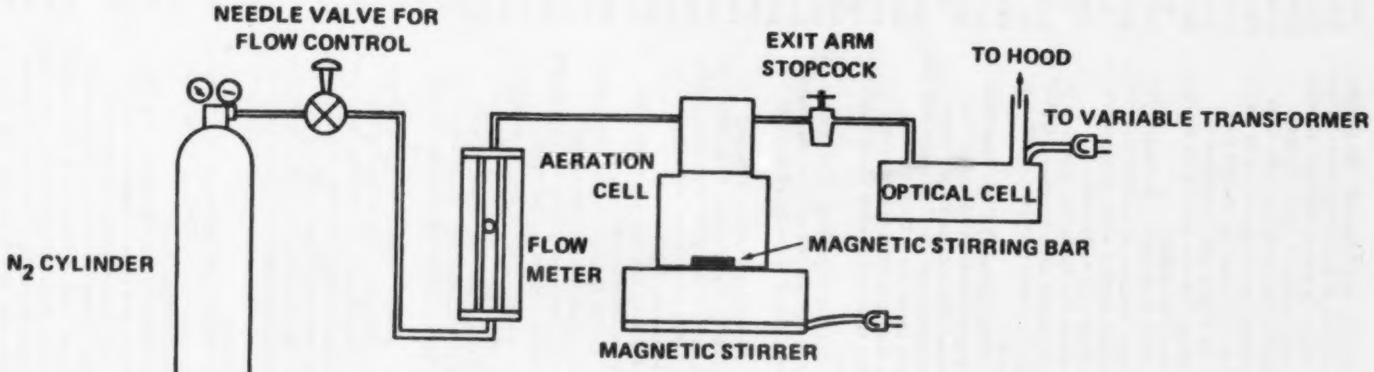

NEEDLE VALVE FOR
FLOW CONTROL
EXIT ARM
STOPCOCK
TO HOOD
TO VARIABLE TRANSFORMER
AERATION
CELL
OPTICAL CELL
FLOW
METER
MAGNETIC STIRRING BAR
N_2 CYLINDER
MAGNETIC STIRRER

Figure 101-5. Schematic of aeration system.

Method 101A. Determination of Particulate and Gaseous Mercury Emissions From Sewage Sludge Incinerators[66]

Introduction

This method is similar to Method 101, except acidic potassium permangante solution is used instead of acidic iodine monochloride for collection.

1. *Applicability and Principle*—1.1 *Applicability*. This method applies to the determination of particulate and gaseous mercury (Hg) emissions from sewage sludge incinerators and other sources as specified in the regulations.

1.2 *Principle*. Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic potassium permanganate ($KMn0_4$) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry.

2. *Range and Sensitivity*—2.1 *Range*. After initial dilution, the range of this method is 20 to 800 ng Hg/ml. The upper limit can be extended by further dilution of the sample.

2.2 *Sensitivity*. The sensitivity of the method depends on the recorder/spectrophotometer combination selected.

3. *Interfering Agents*—3.1 *Sampling*. Excessive oxidizable organic matter in the stack gas prematurely depletes the $KMn0_4$ solution and thereby prevents further collection of Hg.

3.2 *Analysis*. Condensation of water vapor on the optical cell windows causes a positive interference.

4. *Precision*—Based on eight paired-train tests, the within-laboratory standard deviation was estimated to be 4.8 μg Hg/ml in the concentration range of 50 to 130 μg Hg/m³.

5. *Apparatus*—5.1 *Sampling Train and Sample Recovery*. Same as Method 101, Sections 5.1 and 5.2, respectively, except for the following variations:

5.1.1 *Probe Liner*. Same as Method 101, Section 5.1.2, except that if a filter is used ahead of the impingers, the tester must use the probe heating system to minimize the condensation of gaseous Hg.

5.1.2 *Filter Holder (Optional)*. Borosilicate glass with a rigid stainless-steel wire-screen filter support (do not use glass frit supports) and a silicone rubber of Teflon gasket, designed to provide a positive seal against leakage from outside or around the filter. The filter holder must be equipped with a filter heating system capable of maintaining a temperature around the filter holder of 120 ± 15° C (248 ± 25° F) during sampling to minimize both water and gaseous Hg condensation. The tester may use a filter in cases where the stream contains large quantities of particulate matter.

5.2 *Analysis*. The apparatus needed for analysis is the same as Method 101, Sections 5.3 and 5.4, except as follows:

5.2.1 *Volumetric Pipets*. Class A; 1–, 2–, 3–, 4–, 5–, 10–, and 20-ml.

5.2.2 *Graduated Cylinder*. 25–ml.

5.2.3 *Steam Bath*.

6. *Reagents—Use ACS reagent-grade chemicals or equivalent, unless otherwise specified.*

6.1 *Sampling and Recovery*. The reagents used in sampling and recovery are as follows:

6.1.1 *Water*. Deionized distilled, meeting ASTM Specifications for Type I Reagent Water—ASTM Test Method D 1193–74. If high concentrations of organic matter are not expected to be present, the analyst may eliminate the $KMn0_4$ test for oxidizable organic matter. Use this water in all dilutions and solution preparations.

6.1.2 *Nitric Acid (HNO_3), 50 Percent (V/V)*. Mix equal volumes of concentrated HNO_3 and deionized distilled water, being careful to slowly add the acid to the water.

6.1.3 *Silica Gel*. Indicating type, 6- to 16-mesh. If previously used, dry at 175° C (350° F) for 2 hr. The tester may use new silica gel as received.

6.1.4 *Filter (Optional)*. Glass fiber filter, without organic binder, exhibiting at least 99.95 percent efficiency on 0.3 μm dioctyl phthalate smoke particles. The tester may use the filter in cases where the gas stream contains large quantities of particulate matter, but he should analyze blank filters for Hg content.

6.1.5 *Sulfuric Acid (H_2SO_4), 10 Percent (V/V)*. Add and mix 100 ml of concentrated H_2SO_4 with 900 ml of deionized distilled water.

6.1.6 *Absorbing Solution, 4 Percent $KMnO_4$ (W/V)*. Prepare fresh daily. Dissolve 40 g of $KMnO_4$ in sufficient 10 percent H_2SO_4 to make 1 liter. Prepare and store in glass bottles to prevent degradation.

6.2 *Analysis*. The reagents needed for analysis are listed below:

6.2.1 *Tin (II) Solution*. Prepare fresh daily and keep sealed when not being used. Competely dissolve 20 g of tin (II) chloride [or 25 g of tin (II) sulfate] crystals (Baker Analyzed reagent grade or any other brand that will give a clear solution) in 25 ml of concentrated HCl. Dilute to 250 ml with deionized distilled water. Do not substitute HNO_3, H_2SO_4, or other strong acids for the HCl.

6.2.2 *Sodium Chloride—Hydroxylamine Solution*. Dissolve 12 g of sodium chloride and 12 g of hydroxylamine sulfate (or 12 g of hydroxylamine hydrochloride) in deionized distilled water and dilute to 100 ml.

6.2.3 *Hydrochloric Acid (HCl), 8 N*. Dilute 67 ml of concentrated HNO_3 to 100 ml with deionzed distilled water (slowly add the HCl to the water).

6.2.4 *Nitric Acid, 15 Percent (V/V)*. Dilute 15 ml of concentrated HNO_3 to 100 ml with deionized distilled water.

6.2.5 *Mercury Stock Solution, 1 mg Hg/ml*. Prepare and store all mercury standard solutions in borosilicate glass containers. Completely dissolve 0.1354 g of mercury (II) chloride in 75 ml of deionized distilled water. Add 100 ml of concentrated HNO_3, and adjust the volume to exactly 100 ml with deionized distilled water. Mix thoroughly. This solution is stable for at least 1 month.

6.2.6 *Intermediate Mercury Standard Solution, 10 μg Hg/ml*. Prepare fresh weekly. Pipet 5.0 ml of the mercury stock solution (Section 6.2.5) into a 500-ml volumetric flask and add 20 ml of 15 percent HNO_3 solution. Adjust the volume to exactly 500 ml with deionized distilled water. Thoroughly mix the solution.

6.2.7 *Working Mercury Standard Solution, 200 ng Hg/ml*. Prepare fresh daily. Pipet 5.0 ml from the "Intermediate Mercury Standard Solution" (Section 6.2.6) into a 250-ml volumetric flask. Add 5 ml of 4 percent $KMnO_4$ absorbing solution and 5 ml of 15 percent HNO_3. Adjust the volume to exactly 250 ml with deionized distilled water. Mix thoroughly.

6.2.8 *Potassium Permanganate, 5 Percent (W/V)*. Dissolve 5 g of $KMnO_4$ in deionized distilled water and dilute to 100 ml.

6.2.9 *Filter*. Whatman No. 40 or equivalent.

7. *Procedure*—7.1 *Sampling*. The sampling procedure is the same as Method 101, except for changes due to the use of $KMnO_4$ instead of ICl absorbing solution and the possible use of a filter. These changes are as follows:

7.1.1 *Preliminary Determinations*. The preliminary determinations are the same as those given in Method 101, Section 7.1.2, except for the absorbing solution depletion sign. In this method, high oxidizable organic content may make it impossible to sample for the desired minimum time. This problem is indicated by the complete bleaching of the purple color of the $KMnO_4$ solution. In these cases, the tester may divide the sample run into two or more subruns to insure that the absorbing solution would not be depleted. In cases where an excess of water condensation is encountered, collect two runs to make one sample.

7.1.2 *Preparation of Sampling Train*. The preparation of the sampling train is the same as that given in Method 101, Section 7.1.3, except for the cleaning of the glassware [probe, filter holder (if used), impingers, and connectors] and the charging of the first three impingers. In this method, clean all the glass components by rinsing with 50 percent HNO_3, tap water, 8 N HCl, tap water, and finally deionized distilled water. Then place 50 ml of 4 percent $KMnO_4$ in the first impinger and 100 ml in each of the second and third impingers.

If a filter is used, use a pair of tweezers to place the filter in the filter holder. Be sure to center the filter and place the gasket in proper position to prevent the sample gas stream from by-passing the filter. Check the filter for tears after assembly is completed. Be sure also to set the filter heating system at the desired operating temperature after the sampling train has been assembled.

7.1.3 *Sampling Train Operation*. In addition to the procedure given in Method 101, Section 7.1.5, maintain a temperature around the filter (if applicable) of 120°±14° C (248°±25° F).

7.2 *Sample Recovery*. Begin proper cleanup procedure as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When it can be safely handled, wipe off any external particulate matter near the tip of the probe nozzle and place a cap over it. Do not cap off the probe tip tightly while the sampling train is cooling because the resultant vacuum would draw liquid out from the impingers.

Before moving the sample train to the cleanup site, remove the probe from the train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the impinger. Use either ground-glass stoppers, plastic caps, or serum caps to close these openings.

Transfer the probe, impinger assembly, and (if applicable) filter assembly to a cleanup area that is clean, protected from the wind, and free of Hg contamination. The ambient air in laboratories located in the immediate vicinity of Hg-using facilities is not normally free of Hg contamination.

Inspect the train before and during assembly, and note any abnormal conditions. Treat the sample as follows:

7.2.1 *Container No. 1* (Impinger, Probe, and Filter Holder). Use a graduated cylinder; measure the liquid in the first three impingers to within ±1 ml. Record the volume of liquid present (e.g., see Figure 5–3 of Method 5 in Part 60 of 40 CFR). This information is needed to calculate the moisture content of the effluent gas. (Use only graduated cylinder and glass storage bottles that have been precleaned as in Section 7.1.2.) Place the contents of the first three impingers into a 1000-ml glass sample bottle.

(Note.—If a filter is used, remove the filter from its holder, as outlined under "Container No. 3" below.)

Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover the Hg (and any condensate) from the probe nozzle, probe fitting, probe liner and front half of the filter holder (if applicable) as follows: Rinse these components with a total of 250 to 400 ml of fresh 4 percent KMnO$_4$ solution; add all washings to the 1000-ml glass sample bottle; remove any residual brown deposits on the glassware using the minimum amount of 8 N HCl required; and add this HCl rinse to this sample container.

After all washings have been collected in the sample container, tighten the lid on the container to prevent leakage during shipment to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Label the container to clearly identify its contents.

7.2.2. *Container No. 2* (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal. The tester may use as aids a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. It is not necessary to remove the small amount of particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g; record this weight.

7.2.3 *Container No. 3* (Filter). If a filter was used, carefully remove it from the filter holder, place it in a 100-ml glass sample bottle, and add 20 to 40 ml of 4 percent KMnO$_4$. If it is necessary to fold the filter, be sure that the particulate cake is inside the fold. Carefully transfer to the 150-ml sample bottle any particulate matter and filter fibers that adhere to the filter holder gasket by using a dry Nylon bristle brush and a sharp-edged blade. Seal the container. Label the container to clearly identify its contents. Mark the height of the fluid level to determine whether leakage occurs during transport.

7.2.4 *Container No. 4* (Filter Blank). If a filter was used, treat an unused filter from the same filter lot used for sampling in the same manner as Container No. 3.

7.2.5 *Container No. 5* (Absorbing Solution Blank). For a blank, place 500 ml of 4 percent KMnO$_4$ absorbing solution in a 1000-ml sample bottle. Seal the container.

7.3 *Sample Preparation.* Check liquid level in each container to see if liquid was lost during transport. If a noticeable amount of leakage occurred, either void the sample or use methods subject to the approval of the Administrator to account for the losses. Then follow the procedures below.

7.3.1 *Containers No. 3 and No. 4* (Filter and Filter Blank). If a filter was used, place the contents, including the filter, of Containers No. 3 and No. 4 in separate 250-ml beakers and heat the beakers on a steam bath until most of the liquid has evaporated. Do not take to dryness. Add 20 ml of concentrated HNO$_3$ to the beakers, cover them with a glass, and heat on a hot plate at 70° C for 2 hours. Remove from the hot plate and filter the solution through Whatman No. 40 filter paper. Save the filtrate for Hg analysis. Discard the filter.

7.3.2 *Container No. 1* (Impingers, Probe, and Filter Holder). Filter the contents of Container No. 1 through Whatman 40 filter paper to remove the brown MnO$_2$ precipitate. Wash the filter with 50 ml of 4 percent KMnO$_4$ absorbing solution and add this wash to the filtrate. Discard the filter. Combine the filtrates from Containers No. 1 and No. 3 (if applicable), and dilute to a known volume with deionized distilled water. Mix thoroughly.

7.3.3 *Container No. 5* (Absorbing Solution Blank). Treat this container as described in Section 7.3.2. Combine this filtrate with the filtrate with Container No. 4 and dilute to a known volume with deionized distilled water. Mix thoroughly.

7.4 *Analysis.* Calibrate the spectrophotometer and recorder and prepare the calibration curve as described in Sections 8.1 to 8.4. Then repeat the procedure used to establish the calibration curve with appropriately sized aliquots (1 to 10 ml) of the samples (from Sections 7.3.2 and 7.3.3) until two consecutive peak heights agree within ±3 percent of their average value. If the 10-ml sample is below the detectable limit, use a larger aliquot (up to 20 ml), but decrease the volume of water added to the aeration cell accordingly to prevent the solution volume from exceeding the capacity of the aeration bottle. If the peak maximum of a 1.0-ml aliquot is off scale, further dilute the original sample to bring the Hg concentration into the calibration range of the spectrophotometer. If the Hg content of the absorbing solution and filter blank is below the working range of the analytical method, use zero for the blank.

Run a blank and standard at least after every five samples to check the spectrophotometer calibration; recalibrate as necessary.

It is also recommended that at least one sample from each stack test be checked by the Method of Standard Additions to confirm that matrix effects have not interfered in the analysis.

8. *Calibration and Standards*—The calibration and standards are the same as Method 101, Section 8, except for the following variations:

8.1 *Optical Cell Heating System Calibration.* Same as method 101, Section 8.2, except use a 25-ml graduated cylinder to add 25 ml of deionized distilled water to the bottle section of the aeration cell.

8.2 *Spectrophotometer and Recorder Calibration.* The mercury response may be measured by either peak height or peak area. (Note: the temperature of the solution affects the rate at which elemental Hg is released from a solution and, consequently, it affects the shape of the absorption curve (area) and the point of maximum absorbance (peak height). To obtain reproducible results, all solutions must be brought to room temperature before use.) Set the spectrophotometer wave length at 253.7 nm and make certain the optical cell is at the minimum temperature that will prevent water condensation.

Then set the recorder scale as follows: Using a 25-ml graduated cylinder, add 25 ml of deionized distilled water to the aeration cell bottle and pipet 5.0 ml of the working mercury standard solution into the aeration cell. (Note: Always add the Hg-containing solution to the aeration cell after the 25 ml of deionized distilled water.) Place a Teflon-coated stirring bar in the bottle. Add 5 ml of the 4 percent KMnO$_4$ absorbing solution followed by 5 ml of 15 percent HNO$_3$ and 5 ml of 5 percent KMnO$_4$ to the aeration bottle and mix well. Now, attach the bottle section to the bubbler section of the aeration cell and make certain that (1) the aeration cell exit arm stopcock (Figure 101–3 of Method 101) is closed (so that Hg will not prematurely enter the optical cell when the reducing agent is being added) and (2) there is no flow through the bubbler. Add 5 ml of sodium chloride hydroxylamine in 1-ml increments until the solution is colorless. Now add 5 ml of tin (II) solution to the aeration bottle through the side arm. Stir the solution for 15 seconds, turn on the recorder, open the aeration cell exit arm stopcock, and immediately initiate aeration with continued stirring. Determine the maximum absorbance of the standard and set this value to read 90 percent of the recorder full scale.

9. *Calculations*—9.1 *Dry Gas Volume, Volume of Water Vapor and Moisture Content, Stack Gas Velocity, Isokinetic Variation and Acceptable Results, and Determination of Compliance.* Same as Method 101, Sections 9.1, 9.2, 9.3, 9.6, and 9.7, respectively, except use data obtained from this test.

9.2 *Total Mercury.* For each source sample, correct the average maximum absorbance of the two consecutive samples whose peak heights agreed within ±3 percent of their average for the contribution of the field blank. Then calculate the total Hg content in µg in each sample. Correct for any dilutions made to bring the sample into the working range of the spectrophotometer.

9.3 *Mercury Emission Rate.* Calculate the Hg emission rate R in g/day for continuous operations using Equation 101A–1. For cyclic operations, use only the time per day each stack is in operation. The total Hg emission rate from a source will be the summation of results from all stacks.

$$R = \frac{K\, m_{Hg}\, v_s\, A_s\, (86{,}400 \times 10^{-6})}{[V_{m(std)} + V_{w(std)}]\,(T_s/P_s)} \qquad \text{Eq. 101A–1}$$

Where:

m_{Hg} = Total Hg content in each sample, µg.
v_s = Average stack gas velocity, m/sec (fps).
A_s = Stack cross-sectional area, m^2 (ft^2).
86,400 = Conversion factor, sec/day.
10^{-6} = Conversion factor, g/µg.
$V_{m(std)}$ = Dry gas sample volume at standard conditions, corrected for leakage (if any), m^3 (ft^3).
$V_{w(std)}$ = Volume of water vapor at standard conditions, m^3 (ft^3).
T_s = Absolute average stack gas temperature, °K (°R).
P_s = Absolute stack gas pressure, mm Hg (in. Hg).
K = 0.3856 °K/mm Hg for metric units.
= 17.64 °R/in. Hg for English units.

10. *Bibliography.* 1. Same as Method 101, Section 10.

2. Mitchell, W. J., M. R. Midgett, J. C. Suggs, and D. Albrinck.

Test Methods to Determine the Mercury Emissions from Sludge Incineration Plants. U.S. Environmental Protection Agency. Research Triangle Park, North Carolina. Publication No. EPA-600/4-79-058. September 1979.

Method 102. Determination of Particulate and Gaseous Mercury Emissions From Chlor-Alkali Plants—Hydrogen Streams

1. *Introduction*—Although similar to Method 101, Method 102 requires changes to accommodate the sample being extracted from a hydrogen stream. Conduct the test according to Method 101, except as shown below:

2. *Mercury Train Operation*—2.1 *Probe Heating System.* Do not use, unless otherwise specified.

2.2 *Glass Fiber Filter.* Do not use, unless otherwise specified.

2.3 *Safety Procedures.* The sampler must conduct the source test under conditions of utmost safety, because hydrogen and air mixtures are explosive. Since the sampling train essentially is leakless, attention to safe operation can be concentrated at the inlet and outlet. If a leak does occur, however, remove the meter box cover to avoid a possible explosive mixture. The following specific precautions are recommended:

2.3.1 *Operate only the vacuum pump during the test.* The other electrical equipment, e.g., heaters, fans, and timers, normally are not essential to the success of a hydrogen stream test.

2.3.2 *Seal the sample port to minimize leakage of hydrogen from the stack.*

2.3.3 *Vent sampled hydrogen at least 3 m (10 feet) away from the train.* This can be accomplished by attaching a 13-mm-ID (0.50-in) Tygon tube to the exhaust from the orifice meter. (Note: A smaller ID tubing may cause the orifice meter calibration to be erroneous.) Take care to ensure that the exhaust line is not bent or pinched.

2.4 *Setting of Isokinetic Rates.*

2.4.1 If a nomograph is used, take special care in the calculation of the molecular weight of the stack gas and in the setting of the nomograph to maintain isokinetic conditions during sampling (Sections 2.4.1.1 through 2.4.1.3 below).

2.4.1.1 *Calibrate the meter box orifice.* Use the techniques described in APTD-0576 (see Citation 9 in Section 10 of Method 101). Calibration of the orifice meter at flow conditions that simulate the conditions at the source is suggested. Calibration should either be done with hydrogen or with some other gas having a similar Reynolds Number so that there is similarity between the Reynolds Numbers during calibration and during sampling.

2.4.1.2 The nomograph described in APTD-0576 cannot be used to calculate the C factor because the nomograph is designed for use when the stack gas dry molecular weight is 20±4. Instead, the following calculation should be made to determine the proper C factor:

$$C = 0.00154\ \Delta H_@\ C_p{}^2 T_m (P_s/P_m) \frac{(1-B_{ws})^2}{(1-B_{ws})+18\ B_{ws}/M_d}$$

Where:

$\Delta H_@$ = Meter box calibration factor obtained in Section 2.4.1.1, in. H_2O.

C_p = Pitot tube calibration coefficient, dimensionless.

T_m = Absolute temperature of gas at the orifice, °R.

P_s = Absolute pressure of stack gas, in Hg.

P_m = Absolute pressure of gas at the meter, in Hg.

B_{ws} = Fraction by volume of water vapor in the stack gas.

M_d = Dry molecular weight of stack gas, 1b/1b-mole.

Note. This calculation is left in English units, and is not converted to metric units because nomographs are based on English units.

2.4.1.3 Set the calculated C factor on the operating nomograph and select the proper nozzle diameter and K factor as specified in APTD-0576. If the C factor obtained in Section 2.4.1.2 exceeds the values specified on the existing operating nomograph, expand the C scale logarithmically so that the values can be properly located.

2.4.2 If a calculator is used to set isokinetic rates, it is suggested that the isokinetic equation presented in Citation 17 in the Bibliography of Method 101 be used.

2.5 Sampling in Small (<12-in.-Diameter) Stacks. When the stack diameter (or equivalent diameter) is less than 12 inches, conventional pitot tube-probe assemblies should not be used. For sampling guidelines, see Citation 18 in the Bibliography of Method 101.

METHOD 103. BERYLLIUM SCREENING METHOD

1. *Principle and applicability.*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from three points in a duct or stack. The collected sample is analysed for beryllium using an appropriate technique.

1.2 *Applicability.*—This procedure details guidelines and requirements for methods acceptable for use in determining beryllium emissions in ducts or stacks at stationary sources, as specified under the provisions of § 61.14 of the regulations.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the required sampling train configuration is shown in figure 103–1. The essential components of the train are the following:

2.1.1 *Nozzle.*—Stainless steel, or equivalent, with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[1] glass.

2.1.3 *Filter.*—Millipore AA, or equivalent, with appropriate filter holder that provides a positive seal against leakage from outside or around the filter. It is suggested that a Whatman 41, or equivalent, be placed immediately against the back side of the Millipore filter as a guard against breakage of the Millipore. Include the Whatman 41 in the analysis. Equivalent filters must be at least 99.95 percent efficient (DOP Test) and amenable to the analytical procedure.

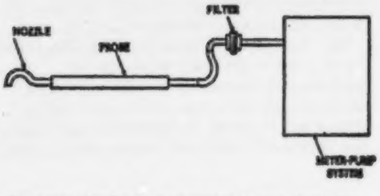


Figure 103-1. Beryllium screening method: sample train schematic.

2.1.4 *Meter-pump system.*—Any system that will maintain isokinetic sampling rate, determine sample volume, and is capable of a sampling rate of greater than 0.5 cfm.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*.—The following equipment shall be used in the manner specified in section 4.3.1.

2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

2.2.3. *Temperature gauge.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gauge.*—Any device to measure stack pressure to within 0.1 in. Hg.

2.2.5 *Barometer.*—To measure atmospheric pressure to within 0.1 in. Hg.

2.2.6 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery.*—2.3.1 *Probe cleaning equipment.*—Probe brush or cleaning rod at least as long as probe, or equivalent. Clean cotton balls, or equivalent, should be used with the rod.

2.3.2 *Leakless glass sample bottles.*

2.4 *Analysis.*—2.4.1 Equipment necessary to perform an atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent analysis.

3. *Reagents.*—3.1 *Sample recovery.*—3.1.1 *Acetone.*—Reagent grade.

3.1.2 *Wash acid.*—1:1 V/V hydrochloric acid-water.

3.2 *Analysis.*—3.2.1 Reagents as necessary for the selected analytical procedure.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 *Selection of a sampling site and number of runs.*—4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross-section, determine an equivalent diameter using the following equation:

$$D_e=\frac{2LW}{L+W} \quad \text{eq. 103–1}$$

where:

D_e=equivalent diameter
L=length
W=width

4.2.3 Some sampling situations may render the above sampling site criteria impractical. When this is the case, an alternate site may be selected but must be no less than two diameters downstream and one-half diameter upstream from any point of disturbance. Additional sample runs are recommended at any sample site not meeting the criteria of section 4.2.2.

4.2.4 Three runs shall constitute a test. The runs shall be conducted at three different points. The three points shall proportionately divide the diameter, i.e. be located at 25, 50 and 75 percent of the diameter from the inside wall. For horizontal ducts, the diameter shall be in the vertical direction. For rectangular ducts, sample on a line through the centroid and parallel to a side. If additional runs are required per section 4.2.3, proportionately divide the duct to accommodate the total number of runs.

4.3 *Measurement of stack conditions.* 4.3.1 Measure the stack gas pressure, moisture, and temperature, using the equipment described in § 2.2. Determine the molecular weight of the stack gas. Sound engineering estimates may be made in lieu of direct measurements. The basis for such estimates shall be given in the test report.

4.4 *Preparation of sampling train.*—4.4.1 Assemble the sampling train as shown in figure 103–1. It is recommended that all glassware be precleaned by soaking in wash acid for 2 hours.

4.4.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sample rate.

4.5 *Beryllium train operation.*—4.5.1 For each run, measure the velocity at the selected sampling point. Determine the isokinetic sampling rate. Record the velocity head and the required sampling rate.

4.5.2 Place the nozzle at the sampling point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. At the conclusion of the test, record the sampling rate. Again measure the velocity head at the sampling point. The required isokinetic rate at the end of the period should not have deviated more than 20 percent from that originally calculated.

4.5.3 Sample at a minimum rate of 0.5 ft³/min. Samples shall be taken over such a period or periods as are necessary to determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow determination or calculation of the emissions which would occur over the duration of the cycle. A minimum sampling time of 2 hours is recommended.

4.5.4 All pertinent data should be included in the test report.

4.6 *Sample recovery.*—4.6.1 It is recommended that all glassware be precleaned as in § 4.4.1. Sample recovery should also be performed in an area free of possible beryllium contamination. When the sampling train is moved, exercise care to prevent breakage and contamination. Set aside a portion of the acetone used in the sample recovery as a blank for analysis. The total amount of acetone used should be measured for accurate blank correction. Blanks can be eliminated if prior analysis shows negligible amounts.

4.6.2 Remove the filter and any loose particulate matter from filter holder and place in a container.

4.6.3 Clean the probe with acetone and a brush or long rod and cotton balls. Wash into the container. Wash out the filter holder with acetone and add to the same container.

4.7 *Analysis.*—4.7.1 Make the necessary preparation of samples and analyze for beryllium. Any currently acceptable method such as atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent may be used.

5. *Calibration and standards*—5.1 *Sampling train.*—5.1.1 As a procedural check, sampling rate regulation should be compared with a dry gas meter, spirometer, rotameter (calibrated for prevailing atmospheric conditions), or equivalent, attached to nozzle inlet of the complete sampling train.

5.1.2 Data from this test and calculations should be shown in test report.

5.2 *Analysis.*—5.2.1 Standardization is made as suggested by the manufacturer of the instrument or the procedures for the analytical method.

6. *Calculations*—6.1 *Total beryllium emission.* Calculate the total amount of beryllium emitted from each stack per day by equation 103–2. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R=\frac{W_t(v_s)_{avg.}A_s}{V_{total}}\times\frac{86,400\text{ seconds/day}}{10^6\ \mu g/g}$$

where:

R=Rate of emission, g/day.
W_t=Total weight of beryllium collected, μg.
V_{total}=Total volume of gas sampled, ft³.
$(v_s)_{avg.}$=Average stack gas velocity, feet per second.
A_s=Stack area, ft².

7. *Test report.* 7.1 A test report shall be prepared which shall include as a minimum:

7.1.1 A detailed description of the sampling train used and results of the procedural check with all data and calculations made.

7.1.2 All pertinent data taken during test, the basis for any estimates made, calculations, and results.

7.1.3 A description of the test site, including a block diagram with a brief description of the process, location of the sample points in the cross section, dimensions and distances from any point of disturbance.

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[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

METHOD 104. REFERENCE METHOD FOR DETERMINATION OF BERYLLIUM EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from the source, and the collected sample is digested in an acid solution and analyzed by atomic absorption spectrophotometry.

1.2 *Applicability.*—This method is applicable for the determination of beryllium emissions in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the sampling train used by EPA is shown in figure 104-1. Commercial models of this train are available, although construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

2.1.1 *Nozzle.*—Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature in the range of the stack temperature at the probe outlet during sampling may be used to prevent condensation from occurring.

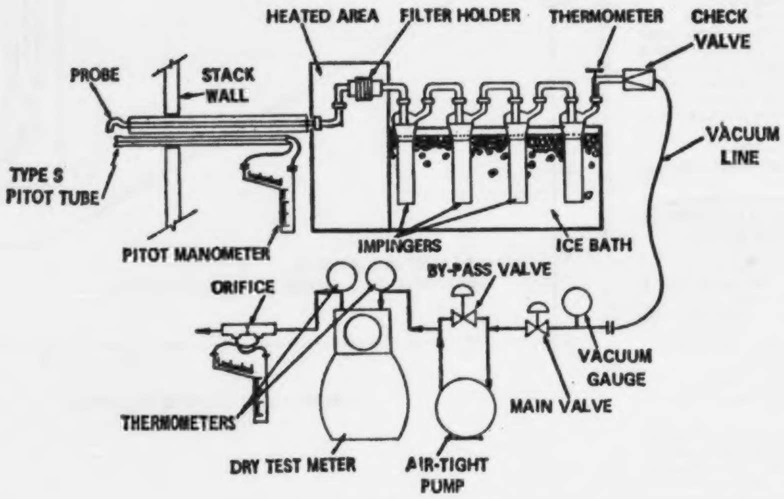

Figure 104-1. Beryllium sampling train

2.1.3 *Pitot tube.*—Type S (figure 104-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Filter holder.*—Pyrex glass. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature in the range of the stack temperature may be used to prevent condensation from occurring.

2.1.5 *Impingers.*—Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a ½-inch i.d. glass tube extending to one-half inch from the bottom of the flask.

2.1.6 *Metering system.*—Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer.*—To measure atmospheric pressure to ± 0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

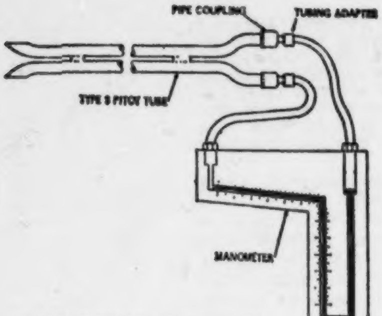

*Figure 104-2. Pilot tube - manometer assembly.

2.2.3 *Temperature gage.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gage.*—Pilot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Probe cleaning rod.*—At least as long as probe.

2.3.2 *Leakless glass sample bottles.*—500 ml.

2.3.3 *Graduated cylinder.*—250 ml.

2.3.4 *Plastic jar.*—Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Atomic absorption spectrophotometer.*—To measure absorbance at 234.8 nm. Perkin Elmer Model 303, or equivalent, with N_2O/acetylene burner.

2.4.2 *Hot plate.*

2.4.3 *Perchloric acid fume hood.*

3. *Reagents*—3.1 *Stock reagents.*—3.1.1 *Hydrochloric acid.*—Concentrated.

3.1.2 *Perchloric acid.*—Concentrated, 70 percent.

3.1.3 *Nitric acid.*—Concentrated.

3.1.4 *Sulfuric acid.*—Concentrated.

3.1.5 *Distilled and deionized water.*

3.1.6 *Beryllium powder.*—98 percent minimum purity.

3.2 *Sampling*—3.2.1 *Filter.* — Millipore AA, or equivalent. It is suggested that a Whatman 41 filter be placed immediately against the back side of the Millipore filter as a guard against breaking the Millipore filter. In the analysis of the filter, the Whatman 41 filter should be included with the Millipore filter.

3.2.2 *Silica gel.*—Indicating type, 6 to 16 mesh, dried at 350° F for 2 hours.

3.2.3 *Distilled and deionized water.*

3.3 *Sample recovery*—3.3.1 *Distilled and deionized water.*

3.3.2 *Acetone.*—Reagent grade.

3.3.3 *Wash acid.*—1.1 V/V hydrochloric acid-water.

3.4 *Analysis.*—3.4.1 *Sulfuric acid solution, 12 N.*—Dilute 333 ml of concentrated sulfuric acid to 1 1 with distilled water.

3.4.2 *25 percent V/V hydrochloric acid-water.*

3.5 *Standard beryllium solution*—3.5.1 *stock solution.*—1 μg/ml beryllium. Dissolve 10 mg of beryllium in 80 ml of 12 N sulfuric acid solution and dilute to a volume of 1000 ml with distilled water. Dilute a 10 ml aliquot to 100 ml with 25 percent V/V hydrochloric acid, giving a concentration of 1 μg/ml. This dilute stock solution should be prepared fresh daily. Equivalent strength (in beryllium) stock solutions may be prepared from beryllium salts as $BeCl_2$ and $Be(NO_3)_2$ (98 percent minimum purity).

4. *Procedure.* 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least 8 stack or duct diameters downstream and 2 diameters upstream from any flow disturbance such as a bend, expansion or contraction. For a rectangular cross-section, determine an equivalent diameter from the following equation:

$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 104–1}$$

where:

D_e = equivalent diameter
L = length
W = width

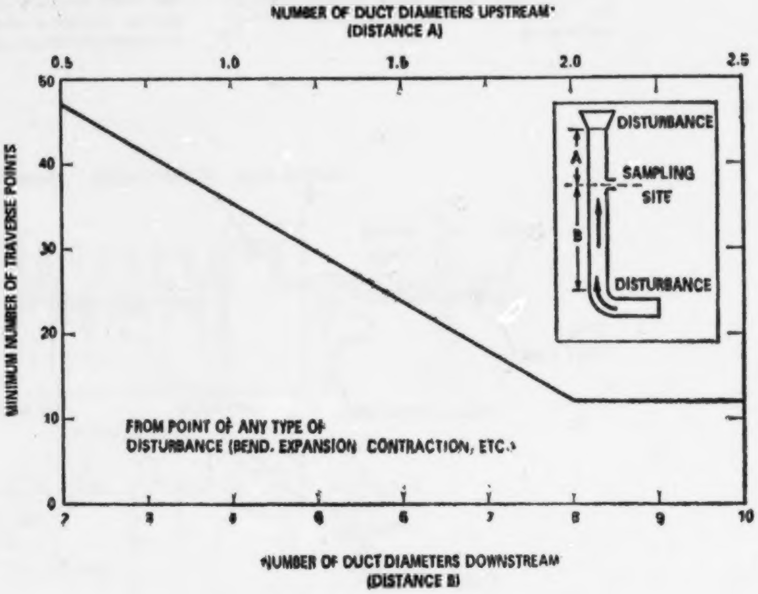

Figure 101-3. Minimum number of traverse points.

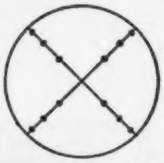

Figure 104-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

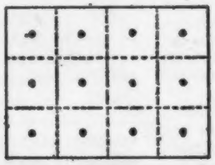

Figure 104-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 104–3 to determine the minimum number of traverse points. However, use figure 104–3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 104–3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 104–3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.3.2.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

Table 104-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								96.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 104-4 and table 104-1. The traverse axes shall divide the stack cross section into equal parts.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between 1 and 2. Locate the traverse points at the centroid of each equal area according to figure 104-5.

4.4 *Measurement of stack conditions.*—4.4.1 Set up the apparatus as shown in figure 104-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by §§ 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 *Preparation of sampling train.*—4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by soaking in wash acid for 2 hours. Place 100 ml of distilled water in each of the first two impringers, leave the third impinger empty, and place approximately 200 g of preweighted silica gel in the fourth impinger. Save a portion of the distilled water as a blank in the sample analysis. Set up the train and the probe as in figure 104-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature at or above the stack temperature. However, membrane filters such as the Millipore AA are limited to about 225° F. If the stack gas is in excess of about 200° F., consideration should be given to an alternate procedure such as moving the filter holder downstream of the first impinger to insure that the filter does not exceed its temperature limit. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F. or less.

4.6 *Beryllium train operation.*—4.6.1 For each run, record the data required on the example sheet shown in figure 104-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 ft.³/min. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended.

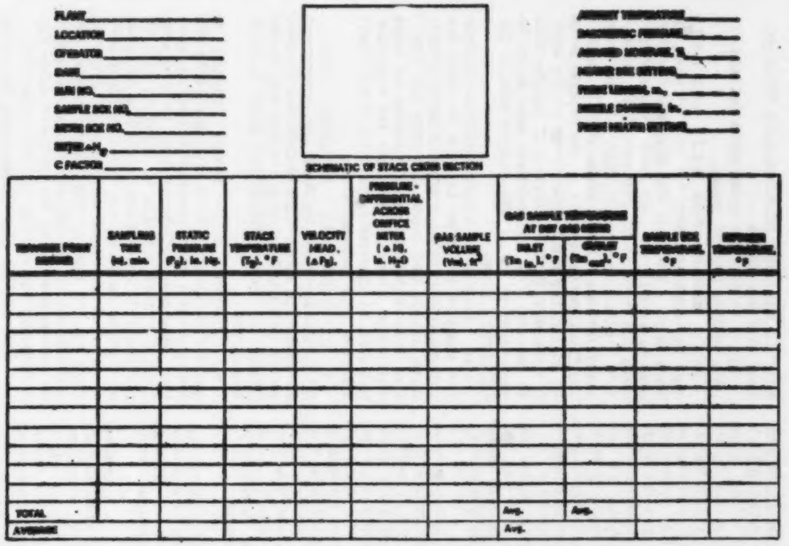
PLANT
LOCATION
OPERATOR
DATE
RUN NO.
SAMPLE BOX NO.
METER BOX NO.
C FACTOR
SCHEMATIC OF STACK CROSS SECTION
SAMPLING TIME (θ), min.
STATIC PRESSURE (P_s), in. Hg.
STACK TEMPERATURE (T_s), °F
VELOCITY HEAD (ΔP_s)
PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O
GAS SAMPLE VOLUME (V_m), ft³
GAS SAMPLE TEMPERATURE AT DRY GAS METER
INLET ($T_{m_{in}}$), °F
OUTLET ($T_{m_{out}}$), °F
°F
°F
TOTAL
AVERAGE
Avg.
Avg.
Avg.

Figure 104-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each, traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note that standard monographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard monograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in § 4.7.

4.7 *Sample recovery.*—4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in § 4.5.1.) This operation should be performed in an area free of possible beryllium contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Remove the filter and any loose particulate matter from the filter holder and place in a sample bottle. Place the contents (measured to ±1 ml) of the first three impingers into another sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with water and acetone, and add this to the latter sample bottle. Clean the probe with a brush or a long slender rod and cotton balls. Use acetone while cleaning. Add these to the sample bottle. Retain a sample of the water and acetone as a blank. The total amount of wash water and acetone used should be measured for accurate blank correction. Place the silica gel in the plastic jar. Seal and secure all sample containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8. Analysis.

4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 234.8 nm.

4.8.2 *Sample preparation.*—The digestion of beryllium samples is accomplished in part in concentrated perchloric acid. *Caution*: The analyst must insure that the sample is heated to light brown fumes after the initial nitric acid addition; otherwise, dangerous perchlorates may result from the subsequent perchloric acid digestion. Perchloric acid also should be used only under a perchloric acid hood.

4.8.2.1 Transfer the filter and any loose particulate matter from the sample container to a 150 ml beaker. Add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy all organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.2 Place a portion of the water and acetone sample into a 150 ml beaker and put on a hotplate. Add portions of the remainder as evaporation proceeds and evaporate to dryness. Cool the residue and add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy any organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid, and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.3 Weigh the spent silica gel and report to the nearest gram.

4.8.2.4 Samples from 4.8.2.1 and 4.8.2.2 may be combined here for ease of analysis. Replace on a hotplate and evaporate to dryness in a perchloric acid hood. Cool and dissolve the residue in 10.0 ml of 25 percent V/V hydrochloric acid. Samples are now ready for the atomic absorption unit. The beryllium concentration of the sample must be within the calibration range of the unit. If necessary, further dilution of sample with 25 percent V/V hydrochloric acid must be performed to bring the sample within the calibration range.

4.8.3 *Beryllium determination.*—Analyze the samples prepared in 4.8.2 at 234.8 nm using a nitrous oxide/acetylene flame. Aluminum, silicon and other elements can interfere with this method if present in large quantities. Standard methods are available, however, to effectively eliminate these interferences (see Reference 5).

5. *Calibration*—5.1 *Sampling train.*—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Standardization is made with the procedure as suggested by the manufacturer with standard beryllium solution. Standard solutions will be prepared from the stock solution by dilution with 25 percent V/V hydrochloric acid. The linearity of working range should be established with a series of standard solutions. If collected samples are out of the linear range, the samples should be diluted. Standards should be interspersed with the samples since the calibration can change slightly with time.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop.*—See data sheet (figure 104-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 104-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s}$$

eq. 104-2

where:

V_{m_s}=Volume of gas sample through the dry gas meter (stack conditions), ft^3.

V_m=Volume of gas sample through the dry gas meter (meter conditions), ft^3.

T_s=Average temperature of stack gas, °R.

T_m=Average dry gas meter temperature, °R.

P_{bar}=Barometric pressure at the orifice meter, in Hg.

ΔH=Average pressure drop across the orifice meter, in H_2O.

13.6=Specific gravity of mercury.

P_s=Stack pressure, P_{bar} ± static pressure, in Hg.

6.3 *Volume of water vapor.*

$$W_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 104-3}$$

where:

V_{w_s}=Volume of water vapor in the gas sample (stack conditions), ft^3.

$K_w = 0.00267 \frac{\text{inHg-ft}^3}{\text{ml °R}}$, when these units are used.

V_{l_c}=Total volume of liquid collected in impingers and silica gel (see figure 104-7), ml.

T_s=Average stack gas temperature, °R.

P_s=Stack pressure, P_{bar}±static pressure, in Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 104-4}$$

where:

V_{total}=Total volume of gas sample (stack conditions), ft^3.

V_{m_s}=Volume of gas through dry gas meter (stack conditions), ft^3.

V_{w_s}=Volume of water vapor in gas sample (stack conditions), ft^3.

6.5 *Stack gas velocity.*

Use equation 104-5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta p})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}}$$

eq. 104-5

where:

$(v_s)_{avg.}$=Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole-°R-inH}_2\text{O}}\right)^{1/2}$, when these units are used.

C_p=Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$=Average stack gas temperature, °R.

$(\sqrt{\Delta p})_{avg.}$=Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 104-6).

P_s=Stack pressure, P_{bar}±static pressure, in Hg.

M_s=Molecular weight of stack gas (wet basis)-the summation of the products of the moleculer weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

	VOLUME OF LIQUID WATER COLLECTED		
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g	
FINAL			
INITIAL			
LIQUID COLLECTED			
TOTAL VOLUME COLLECTED		g*	ml

*CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml):

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 104-7. Analytical data.

PLANT________________________________

DATE________________________________

RUN NO.________________________________

STACK DIAMETER, in.________________________

BAROMETRIC PRESSURE, in. Hg.__________________

STATIC PRESSURE IN STACK (P_g), in. Hg._________

OPERATORS______________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_S), °F
	AVERAGE:		

Figure 104-8. Velocity traverse data.

Figure 104-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 104-8 to determine the average stack gas velocity from equation 104-5.

6.6 *Beryllium collected.*—Calculate the total weight of beryllium collected by using equation 104-6.

$$W_t = V_tC_t - V_wC_w - V_aC_a \quad \text{eq. 104-6}$$

where:

W_t = Total weight of beryllium collected, μg.

V_t = Total volume of hydrochloric acid from step 4.8.2.4, ml.

C_t = Concentration of beryllium found in sample, μg/ml.

V_w = Total volume of water used in sampling (impinger contents plus all wash amounts), ml.

C_w = Blank concentration of beryllium in water, μg/ml.

V_a = Total volume of acetone used in sampling (all wash amounts), ml.

C_a = Blank concentration of beryllium in acetone, μg/ml.

6.7 *Total beryllium emissions.*—Calculate the total amount of beryllium emitted from each stack per day by equation 104-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t(v_s)_{avg.}A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6\ \mu g/g} \quad \text{eq. 104-7}$$

where:

R = Rate of emission, g/day.

W_t = Total weight of beryllium collected, μg.

V_{total} = Total volume of gas sample (stack conditions), ft³.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft².

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I = \frac{100V_{total}}{A_n\Theta(vs)_{avg.}} \quad \text{eq. 104-8}$$

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), ft³.

A_n = Probe tip area, ft².

Θ = Sampling time, sec.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If 90 percent $\leq I \leq$ 110 percent, the results are acceptable; otherwise, reject the test and repeat.

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METHOD 105. METHOD FOR DETERMINATION OF MERCURY IN WASTEWATER TREATMENT PLANT SEWAGE SLUDGES

1. *Principle and applicability.* 1.1 Principle—A weighed portion of the sewage sludge sample is digested in aqua regia for 2 minutes at 95°C, followed by oxidation with potassium permanganate. Mercury in the digested sample is then measured by the conventional spectrophotometer cold vapor technique. An alternative digestion involving the use of an autoclave is described in paragraph 4.5.2 of this method.

1.2 Applicability—This method is applicable for the determination of total organic and inorganic mercury content in sewage sludges, soils, sediments, and bottom-type materials. The normal range of this method is 0.2 to 5 μg/g. The range may be extended above or below the normal range by increasing or decreasing sample size and through instrument and recorder control.

2. *Apparatus.* 2.1 Analysis—The conventional cold vapor technique(5) is used to analyze the sample.

2.1.1 Atomic Absorption Spectrophotometer[1]—Any atomic absorption unit having an open sample presentation area in which to mount the absorption cell is suitable. Instrument settings recommended by the particular manufacturer should be followed

2.1.2 Mercury Hollow Cathode Lamp—Westinghouse WL-22847, argon filled, or equivalent.

2.1.3 Recorder—Any multirange, variable-speed recorder that is compatible with the UV detection system is suitable.

2.1.4 Absorption Cell—Standard spectrophotometer cells 10 cm long, having quartz end windows may be used. Suitable cells may be constructed from plexiglass tubing, 2.5 cm O.D. x 11.4 cm (ca. 1" O.D. x 4½"). The ends are ground perpendicular to the longitudinal axis, and quartz windows [2.5 cm diameter x 0.16 cm thickness (ca. 1" diameter x 1/16" thickness)] are cemented in place. Gas inlet and outlet ports [also of plexiglass but 0.6 cm O.D. (ca. ¼" O.D.)] are attached approximately 1.3 cm (½") from each end. The cell is strapped to a burner for support and aligned in the light beam to give the maximum transmittance. NOTE: Two 5.1 cm x 5.1 cm (ca. 2" x 2") cards with 2.5 cm (ca. 1") diameter holes may be placed over each end of the cell to assist in positioning the cell for maximum transmittance.

2.1.5 Air Pump—Any peristaltic pump capable of delivering 1 liter of air per minute may be used. A Masterflex pump with electronic speed control has been found to be satisfactory. (Regulated compressed air can be used in an open one-pass system.)

2.1.6 Flowmeter—Capable of measuring an air flow of 1 liter per minute.

2.1.7 Aeration Tubing—Tygon tubing is used for passage of the mercury vapor from the sample bottle to the absorption cell and return. Straight glass tubing terminating in a coarse porous frit is used for sparging air into the sample.

2.1.8 Drying Tube—15 cm long x 1.9 cm diameter (ca. 6" long x ¾" diameter) tube containing 20 grams of the desiccant magnesium perchlorate. The apparatus is assembled as shown in Figure 105-1. In place of the magnesium perchlorate drying tube, a small reading lamp with 60W bulb may be used to prevent condensation of moisture inside the cell. The lamp is positioned so as not to interfere with the measurement and to shine on the absorption cell maintaining the air temperature about 5°C above ambient.

3. *Reagents.* 3.1 Analysis.

3.1.1 Aqua Regia—Prepare immediately before use by carefully adding three volumes of concentrated HCl to one volume of concentrated HNO_3.

3.1.2 Sulfuric Acid, 0.5N—Dilute 14.0 ml of concentrated sulfuric acid to 1.0 liter.

3.1.3 Stannous Sulfate—Add 25 g stannous sulfate to 250 ml of 0.5N sulfuric acid. This mixture is a suspension and should be stirred continuously during use. Stannous chloride may be used in place of the stannous sulfate.

3.1.4 Sodium Chloride—Hydroxylamine Sulfate Solution—Dissolve 12 grams of sodium chloride and 12 grams of hydroxylamine sulfate in distilled water and dilute to 100 ml. Hydroxylamine hydrochloride may be used in place of the hydroxylamine sulfate.

3.1.5 Potassium Permanganate—5% solution, w/v. Dissolve 5 grams of potassium permanganate in 100 ml of distilled water.

3.1.6 Stock Mercury Solution—Dissolve 0.1354 grams of reagent grade mercuric chloride (Assay >95%) in 75 ml of distilled water. Add 10 ml of concentrated nitric acid and adjust the volume to 100.0 ml. 1 ml = 1 mg Hg.

3.1.7 Working Mercury Solution—Make successive dilutions of the stock mercury solution to obtain a working standard containing 0.1 μg per ml. This working standard and the dilutions of the stock mercury solution should be prepared fresh daily. Acidity of the working standard should be maintained at 0.15% nitric acid. This acid should be added to the flask as needed before the addition of the aliquot. Mercuric solutions should not be prepared in plastic containers.

4. *Procedures.* Samples for mercury analysis are subject to contamination from a variety of sources. Extreme care must be taken to prevent contamination. Certain interferences may occur during the analysis procedures. Extreme caution must be taken to avoid inhalation of mercury.

4.1 Sample Handling and Preservation.

4.1.1 Because of the extreme sensitivity of the analytical procedure and the omnipresence of mercury, care must be taken to avoid extraneous contamination. Sampling devices, sample containers, and reagents should be ascertained to be free of significant amounts of mercury; the sample should not be exposed to any condition in the laboratory that may result in contact or airborne mercury contamination. Sample containers to be used for collection and shipment of mercury samples should be properly cleaned before use. These should be rinsed with at least 20% v/v HNO_3 followed by distilled water.

4.1.2 While the sample may be analyzed without drying, it has been found to be more convenient to analyze a dry sample. Moisture may be driven off in a drying oven at a temperature of 60°C. No significant mercury losses have been observed by using this drying step. The dry sample should be pulverized and thoroughly mixed before the aliquot is weighed.

4.2 Interferences.

4.2.1 Interferences that may occur in sludge samples are sulfides, high copper, high chlorides, etc. A discussion of possible interferences and suggested preventative measures to be taken is given in Reference (6) (7).

4.2.2 Volatile materials which absorb at the 253.7 nm will cause a positive interference. In order to remove any interfering volatile materials, the dead air space in the BOD bottle should be purged with nitrogen before the addition of stannous sulfate.

4.3 Handling Sample Mercury Vapors After Analysis.

4.3.1 Because of the toxic nature of mercury vapor, precaution must be taken to avoid its inhalation. Therefore, a bypass should be included in the analysis system to either vent the mercury vapor into an exhaust hood or pass the vapor through some absorbing media, such as:

(a) equal volumes of 0.1N $KMNO_4$ and 10% H_2SO_4;

(b) 0.25% iodine in a 3% KI solution.

A specially treated charcoal that will absorb mercury vapor is also available from Barnebey and Cheney, E. 8th Ave. and North Cassidy St., Columbus, Ohio 43219, Catalog No. 580-13 or No. 580-22.[2]

4.4 Calibration.

4.4.1 Transfer 0, 0.5, 1.0, 2.0, 5.0 and 10 ml aliquots of the working mercury solution containing 0 to 1.0 μg of mercury to a series of 300-ml BOD bottles. Add enough distilled water to each bottle to make a total volume of 10 ml. Add 5 ml of aqua regia and heat 2 minutes in a water bath at 95°C. Allow the sample to cool and add 50 ml distilled water and 15 ml of $KMnO_4$ solution to each bottle and return to the water bath for 30 minutes. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Add 50 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate solution and immediately attach the bottle to the aeration apparatus. At this point, the sample is allowed to stand quitely without manual agitation. The circulating pump, which has previously been adjusted to a rate of 1 liter per minute, is allowed to run continuously. The absorbance, as exhibited either on the spectrophotometer or the recorder, will increase and reach maximum within 30 seconds. As soon as the recorder pen levels off, approximately 1 minute, open the bypass valve and continue the aeration until the absorbance returns to its minimum value. Close the bypass valve, remove the fritted tubing from the BOD bottle and continue the aeration. Proceed with the standards and construct a standard curve by plotting peak height versus micrograms of mercury.

4.5 Analysis.

4.5.1 Weigh triplicate 0.2g ± 0.001 g portions of dry sample and place in bottom of a BOD bottle. Add 5 ml of distilled water and 5 ml of aqua regia. Heat 2 minutes in a water bath at 95°C. Cool and add 50 ml distilled water and 15 ml potassium permanganate solution to each sample bottle. Mix thoroughly and place in the water bath for 30 minutes at 95°C. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate to reduce the excess permanganate. Add 55 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate and immediately attach the bottle to the aeration apparatus. With each sample, continue as described in paragraph 4.4.1 of this method.

4.5.2 An alternative digestion procedure using an autoclave may also be used. In this method 5 ml of concentrated H_2SO_4 and 2 ml of concentrated HNO_3 are added to the 0.2 grams of sample. 5 ml of saturated $KMnO_4$ solution are added and the bottle is covered with a piece of aluminum foil. The samples are autoclaved at 121°C and 2.1 kg/cm² (ca. 15 psig) for 15 minutes. Cool, make up to a volume of 100 ml with distilled water, and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Purge the dead air space and continue as described in paragraph 4.4.1 of this method.

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[1] Instruments designed specifically for the measurement of mercury using the cold vapor technique are commercially available and may be substituted for the atomic absorption spectrophotometer.

[2] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

5. *Calculation.* 5.1 Measure the peak height of the unknown from the chart and read the mercury value from the standard curve.

5.2 Calculate the mercury concentration in the sample by the formula:

$$\mu g\ Hg/gm = \frac{\mu g\ Hg\ \text{in the aliquot}}{\text{wt. of the aliquot in g}}$$

5.3 Report mercury concentrations as follows: Below 0.1 µg/g; between 0.1 and 1 µg/g, to the nearest 0.01 µg/g; between 1 and 10 µg/g, to nearest 0.1 µg; above 10 µg/g, to nearest µg.

6. *Precision and accuracy.* 6.1 According to the provisional method in reference number 5, the following standard deviations on replicate sediment samples have been recorded at the indicated levels: 0.29 µg/g ± 0.02 and 0.82 µg/g ± 0.03. Recovery of mercury at these levels, added as methyl mercuric chloride, was 97 and 94%, respectively.

7. *References.*

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METHOD 106—DETERMINATION OF VINYL CHLORIDE FROM STATIONARY SOURCES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 An integrated bag sample of stack gas containing vinyl chloride (chloroethene) is subjected to chromatographic analysis, using a flame ionization detector.[38]

1.2 The method is applicable to the measurement of vinyl chloride in stack gases from ethylene dichloride, vinyl chloride and polyvinyl chloride manufacturing processes, except where the vinyl chloride is contained in particulate matter.

2. Range and Sensitivity.

The lower limit of detection will vary according to the chromatograph used. Values reported include 1 × 10^{-7} mg and 4 × 10^{-7} mg.

3. *Interferences*. Acetaldehyde, which can occur in some vinyl chloride sources, will interfere with the vinyl chloride peak from the Chromasorb 102[1] column. See sections 4.3.2 and 6.4. If resolution of the vinyl chloride peak is still not satisfactory for a particular sample, then chromatograph parameters can be further altered with prior approval of the Administrator. If alteration of the chromatograph parameters fails to resolve the vinyl chloride peak, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, must be performed.[38]

4. Apparatus.

4.1 *Sampling* (Figure 106-1).[38]

4.1.1 Probe—Stainless steel, Pyrex glass, or Teflon tubing according to stack temperature, each equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample line—Teflon, 6.4 mm outside diameter, of sufficient length to connect probe to bag. A new unused piece is employed for each series of bag samples that constitutes an emission test.

4.1.3 Male (2) and female (2) stainless steel quick-connects, with ball checks (one pair without) located as shown in Figure 106-1.[38]

4.1.4 Tedlar bags, 100 liter capacity—To contain sample. Teflon bags are not acceptable. Aluminized Mylar bags may be used, provided that the samples are analyzed within 24 hours of collection.

4.1.5 Rigid leakproof containers for 4.1.4, with covering to protect contents from sunlight.

4.1.6 Needle valve—To adjust sample flow rate.

4.1.7 Pump—Leak-free. Minimum capacity 2 liters per minute.

4.1.8 Charcoal tube—To prevent admission of vinyl chloride to atmosphere in vicinity of samplers.

4.1.9 Flow meter—For observing sample flow rate; capable of measuring a flow range from 0.10 to 1.00 liter per minute.

4.1.10 *Connecting tubing*. Teflon, 6.4 mm outside diameter, to assemble sample train (Figure 106-1).[38]

4.1.11 Pitot tube—Type S (or equivalent), attached to the probe so that the sampling flow rate can be regulated proportional to the stack gas velocity.

4.2 Sample recovery.

4.2.1 Tubing—Teflon, 6.4 mm outside diameter, to connect bag to gas chromatograph sample loop. A new unused piece is employed for each series of bag samples that constitutes an emission test, and is to be discarded upon conclusion of analysis of those bags.

4.3 Analysis.

4.3.1 Gas chromatograph—With flame ionization detector, potentiometric strip chart recorder and 1.0 to 5.0 ml heated sampling loop in automatic sample valve.

4.3.2 *Chromatographic column*. Stainless steel, 2 m×3.2 mm, containing 80/100 mesh Chromasorb 102. A secondary column of GE SF-96, 20 percent on 60/80 mesh AW Chromasorb P, stainless steel, 2 m×3.2 mm or Porapak T, 80/100 mesh, stainless steel, 1 m×3.2 mm is required if acetaldehyde is present. If used, a secondary column is placed after the Chromasorb 102 column. The combined columns should then be operated at 120° C.[38]

4.3.3 Flow meters (2)—Rotameter type, 0 to 100 ml/min capacity, with flow control valves.

4.3.4 Gas regulators—For required gas cylinders.

4.3.5 Thermometer—Accurate to one degree centigrade, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer—Accurate to 5 mm Hg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump—Leak-free. Minimum capacity 100 ml/min.

4.4 Calibration.

4.4.1 Tubing—Teflon, 6.4 mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar bags—Sixteen-inch square size, separate bag marked for each calibration concentration.

4.4.3 Syringe—0.5 ml, gas tight.

4.4.4 Syringe—50μl, gas tight.

4.4.5 Flow meter—Rotameter type, 0 to 1000 ml/min range accurate to ±1%, to meter nitrogen in preparation of standard gas mixtures.

4.4.6 Stop watch—Of known accuracy, to time gas flow in preparation of standard gas mixtures.

5. Reagents. It is necessary that all reagents be of chromatographic grade.

5.1 Analysis.

5.1.1 Helium gas or nitrogen gas—Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen gas—Zero grade.

5.1.3 Oxygen gas, or Air, as required by the detector—Zero grade.

5.2 *Calibration*. Use one of the following options: either 5.2.1 and 5.2.2, or 5.2.3.[38]

5.2.1 *Vinyl chloride, 99.9+ percent*. Pure vinyl chloride gas certified by the manufacturer to contain a minimum of 99.9 percent vinyl chloride for use in the preparation of standard gas mixtures in Section 7.1. If the gas manufacturer maintains a bulk cylinder supply of 99.9+ percent vinyl chloride, the certification analysis may have been performed on this supply rather than on each gas cylinder prepared from this bulk supply. The date of gas cylinder preparation and the certified analysis must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer.[38]

5.2.2 *Nitrogen gas*. Zero grade, for preparation of standard gas mixtures.[38]

5.2.3 *Cylinder standards* (3). Gas mixture standards (50, 10, and 5 ppm vinyl chloride in nitrogen cylinders) for which the gas composition has been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer. These gas mixture standards may be directly used to prepare a chromatograph calibration curve as described in section 7.2.[38]

5.2.3.1 *Cylinder standards certification*. The concentration of vinyl chloride in nitrogen in each cylinder must have been certified by the manufacturer by a direct analysis of each cylinder using an analytical procedure that the manufacturer had calibrated on the day of cylinder analysis. The calibration of the analytical procedure shall, as a minimum, have utilized a three-point calibration curve. It is recommended that the manufacturer maintain two calibration standards and use these standards in the following way: (1) A high concentration standard (between 50 and 100 ppm) for preparation of a calibration curve by an appropriate dilution technique; (2) a low concentration standard (between 5 and 10 ppm) for verification of the dilution technique used.[38]

5.2.3.2 *Establishment and verification of calibration standards*. The concentration of each calibration standard must have been established by the manufacturer using reliable procedures. Additionally, each calibration standard must have been verified by the manufacturer by one of the following procedures, and the agreement between the initially determined concentration value and the verification concentration value must be within ± 5 percent: (1) verification value determined by comparison with a calibrated vinyl chloride permeation tube, (2) verification value determined by comparison with a gas mixture prepared in accordance with the procedure described in section 7.1 and using 99.9+ percent vinyle chloride, or (3) verification value obtained by having the calibration standard analyzed by the National Bureau of Standards. All calibration standards must be renewed on a time interval consistent with the shelf life of the cylinder standards sold.[38]

6. Procedure.

6.1 Sampling. Assemble the sample train as in Figure 106-1. Perform a bag leak check according to Section 7.4. Observe that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle valve adjusted to yield a flow of 0.5 lpm. After a period of time sufficient to purge the line several times has elapsed, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate proportional to the stack velocity. Direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect the bag container from sunlight.

6.2 *Sample storage*. Sample bags must be kept out of direct sunlight. When at all possible analysis is to be performed within 24 hours, but in no case in excess of 72 hours of sample collection.[38]

6.3 Sample recovery. With a piece of Teflon tubing identified for that bag, connect a

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

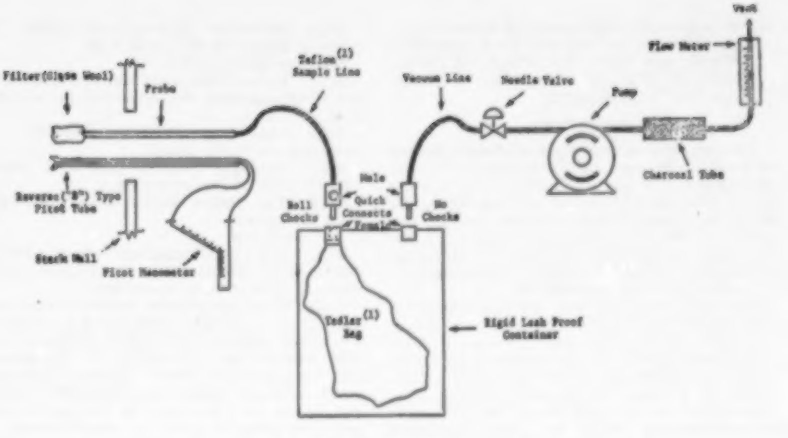

Figure 106-1. Integrated bag sampling train.

(1) Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

bag inlet valve to the gas chromatograph sample valve. Switch the valve to withdraw gas from the bag through the sample loop. Plumb the equipment so the sample gas passes from the sample valve to the leak-free pump, and then to a charcoal tube, followed by a 0–100 ml/min rotameter with flow control valve.

6.4 Analysis. Set the column temperature to 100° C, the detector temperature to 150° C, and the sample loop temperature to 70° C. When optimum hydrogen and oxygen flow rates have been determined verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 40 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base line drift has ceased. Purge the sample loop for thirty seconds at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed and the attenuator setting. Record the laboratory pressure. From the chart, select the peak having the retention time corresponding to vinyl chloride, as determined in Section 7.2. Measure the peak area, A_m, by use of a disc integrator of a planimeter. Measure the peak height, H_m. Record A_m, H_m, and the retention time. Repeat the injection at least two times or until two consecutive vinyl chloride peaks do not vary in area more than 5%. The average value for these two areas will be used to compute the bag concentration.[30]

Compare the ratio of H_m to A_m for the vinyl chloride sample with the same ratio for the standard peak which is closest in height. As a guideline, if these ratios differ by more than 10%, the vinyl chloride peak may not be pure (possibly acetaldehyde is present) and the secondary column should be employed (see Section 4.3.2).

6.5 Measure the ambient temperature and barometric pressure near the bag. (Assume the relative humidity to be 100 percent.) From a water saturation vapor pressure table, determine and record the water vapor content of the bag.[30]

7. Calibration and Standards.

7.1 *Preparation of vinyl chloride standard gas mixtures.* Evacuate a sixteen-inch square Tedlar bag that has passed a leak check (described in Section 7.4) and meter in 5 liters of nitrogen. While the bag is filling, use the 0.5 ml syringe to inject 250μl of 99.9+ percent vinyl chloride through the wall of the bag. Upon withdrawing the syringe needle, immediately cover the resulting hole with a piece of adhesive tape. The bag now contains a vinyl chloride concentration of 50 ppm. In a like manner use the other syringe to prepare gas mixtures having 10 and 5 ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases. These gas mixture standards may be used for 10 days from the date of preparation, after which time preparation of new gas mixtures is required. (CAUTION.—Contamination may be a problem when a bag is reused if the new gas mixture standard contains a lower concentration than the previous gas mixture standard did.)[38]

7.2 Determination of vinyl chloride retention time. This section can be performed simultaneously with Section 7.3. Establish chromatograph conditions identical with those in Section 6.3, above. Set attenuator to X 1 position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column temperature, the carrier gas flow rate, the chart speed and the attenuator setting. Record peaks and detector responses that occur in the absence of vinyl chloride. Maintain conditions. With the equipment plumbing arranged identically to Section 6.3, flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the vinyl chloride calibration mixtures and activate the sample valve. Record the injection time. Select the peak that corresponds to vinyl chloride. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This quantity, divided by the chart speed, is defined as the retention time record.

7.3 *Preparation of chromatograph calibration curve.* Make a gas chromatographic measurement of each gas mixture standard (described in section 5.2.2 or 7.1) using conditions identical with those listed in sections 6.3 and 6.4. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with each standard gas mixture and activate the sample valve. Record C_c, the concentration of vinyl chloride injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multiplied by the attenuator setting. Repeat until two injection areas are within 5 percent, then plot these points v. C_c. When the other concentrations have been plotted, draw a smooth curve through the points. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.[38]

7.4 Bag leak checks. While performance of this section is required subsequent to bag use, it is also advised that it be performed prior to bag use. After each use, make sure a bag did not develop leaks as follows. To leak check, connect a water manometer and pressurize the bag to 5–10 cm H_2O (2–4 in H_2O). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. Also check the rigid container for leaks in this manner.

(NOTE: An alternative leak check method is to pressurize the bag to 5–10 cm H_2O or 2–4 in. H_2O and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in-line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. Calculations.

8.1 Determine the sample peak area as follows:

$$A_c = A_m A_f$$

Equation 106–1

where:

A_c = The sample peak area.
A_m = The measured peak area.
A_f = The attenuation factor.

8.2 Vinyl chloride concentrations. From the calibration curve described in Section 7.3, above, select the value of C_c that corresponds to A_c, the sample peak area. Calculate C_b as follows:

$$C_b = \frac{C_c P_r T_i}{P_i T_r (1 - B_{wb})}$$

Equation 106–2

Where:

B_{wb} = The water vapor content of the bag sample, as analyzed.
C_b = The concentration of vinyl chloride in the bag sample in ppm.
C_c = The concentration of vinyl chloride indicated by the gas chromatograph, in ppm.
P_r = The reference pressure, the laboratory pressure recorded during calibration, mm Hg.
T_i = The sample loop temperature on the absolute scale at the time of analysis, °K.
P_i = The laboratory pressure at time of analysis, mm Hg.
T_r = The reference temperature, the sample loop temperature recorded during calibration, °K.

9. References.

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2. "Evaluation of A Collection and Analytical Procedure for Vinyl Chloride in Air," by G. D. Clayton and Associates, December 13, 1974. EPA Contract No. 68–02–1408, Task Order No. 2, EPA Report oN. 75–VCL–1.

3. "Standardization of Stationary Source Emission Method for Vinyl Chloride," by Midwest Research Institute, 1976. EPA Contract No. 68–02–1098, Task Order No. 7.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

METHOD 107—DETERMINATION OF VINYL CHLORIDE CONTENT OF INPROCESS WASTEWATER SAMPLES, AND VINYL CHLORIDE CONTENT OF POLYVINYL CHLORIDE RESIN, SLURRY, WET CAKE, AND LATEX SAMPLES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 The basis for this method relates to the vapor equilibrium which is established between RVCM, PVC, resin, water, and air in a closed system. It has been demonstrated that the RVCM in a PVC resin will equilibrate in a closed vessel quite rapidly, provided that the temperature of the PVC resin is maintained above the glass transition temperature of that specific resin.

1.2 This procedure is suitable for determining the vinyl choride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused forms, such as sheet or cubes. If a resolution of the vinyl chloride peak is not satisfactory for a particular sample, then chromatograph parameters may be altered provided that the precision and reproducibility of the analysis of vinyl chloride cylinder standards are not impaired. If there is reason to believe that some other hydrocarbon with an identical retention time is present in the sample, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, should be performed.[38]

2. Range and Sensitivity.

The lower limit of detection of vinyl chloride will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg. With proper calibration, the upper limit may be extended as needed.

3. Precision and Reproducibility.

An interlaboratory comparison between seven laboratories of three resin samples, each split into three parts, yielded a standard deviation of 2.63% for a sample with a mean of 2.09 ppm, 4.16% for a sample with a mean of 1.66 ppm, and 5.29% for a sample with a mean of 62.66 ppm.

4. Safety.

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with VCM/air mixtures must be held to a minimum. When they are required, the vapor must be routed to outside air. Vinyl chloride, even at low ppm levels, must never be vented inside the laboratory. After vials have been analyzed, the pressure within the vial must be vented prior to removal from the instrument turntable. Vials must be vented into an activated charcoal tube using a hypodermic needle to prevent release of vinyl chloride into the laboratory atmosphere. The charcoal must be replaced prior to vinyl chloride breakthrough.

5. Apparatus.

5.1 Sampling.

5.1.1 Bottles—60 ml (2 oz), with waxed lined screw on tops, for PVC samples.

5.1.2 Vials—50 ml Hypo-vials,[1] sealed with Teflon faced Tuf-Bond discs for water samples.

5.1.3 Electrical tape—or equivalent, to prevent loosening of bottle tops.

5.2 Sample recovery.

5.2.1 Vials—With seals and caps, Perkin-Elmer Corporation No. 105-0118, or equivalent.

5.2.2 Analytical balance—Capable of weighing to ±0.001 gram.

5.2.3. Syringe, 100 μl—Precision Series "A" No. 010025, or equivalent.

5.2.4 Vial Sealer, Perkin-Elmer No. 105-0106 or equivalent.

5.3 Analysis.

5.3.1 Gas chromatograph—Perkin-Elmer Corporation Model F-40 head-space analyzer, No. 104-0001, or equivalent.

5.3.2 *Chromatographic column.* Stainless steel, 2 m × 3.2 mm, containing 0.4 percent Carbowax 1500 on Carbopak A, Perkin-Elmer Corporation No. 105-0133, or equivalent. Carbopak C can be used in place of Carbopak A. If methanol and/or acetaldehyde is present in the sample, a pair of Poropak Q columns in series (1 m × 3.2 mm followed by 2 m × 3.2 mm) with provision for backflush of the first column has been shown to provide adequate separation of vinyl chloride.[38]

5.3.3 Thermometer—0 to 100° C, accurate to ±0.1° C, Perkin-Elmer No. 105-0109 or equivalent.

5.3.4. Sample tray thermostat system—Perkin-Elmer No. 105-0103, or equivalent.

5.3.5 Septa—Sandwich type, for automatic dosing, 13 mm, Perkin-Elmer No. 105-1008, or equivalent.

5.3.6 Integrator - recorder — Hewlett - Packard Model 3380A, or equivalent.

5.3.7 Filter drier assembly (3)—Perkin-Elmer No. 2230117, or equivalent.

5.3.8 Soap film flowmeter—Hewlett Packard No. 0101-0113, or equivalent.

5.4 Calibration.

5.4.1 Regulators—for required gas cylinders.

6. Reagents.

6.1 Analysis.

6.1.1 Hydrogen gas—zero grade.

6.1.2 Nitrogen gas—zero grade.

6.1.3 Air—zero grade.

6.2 *Calibration.*

6.2.1 *Cylinder standards* (4). Gas mixture standards (50, 500, 2,000, and 4,000 ppm vinyl chloride in nitrogen cylinders) for which the gas composition has been certified by the manufacturer. Lower concentration standards should be obtained if lower concentrations of vinyl chloride samples are expected, as the intent is to bracket the sample concentrations with standards. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer.[38]

6.2.1.1 *Cylinder standards certification.* The concentration of vinyl chloride in nitrogen in each cylinder must have been certified by the manufacturer by a direct analysis of each cylinder using an analytical procedure that the manufacturer had calibrated on the day of cylinder analysis. The calibration of the analytical procedure shall, as a minimum, have utilized a three-point calibration curve. It is recommended that the manufacturer maintain two calibration standards and use these standards in the following way: (1) A high concentration standard (between 4,000 and 8,000 ppm) for preparation of a calibration curve by an appropriate dilution technique; (2) a low concentration standard (between 50 and 500 ppm) for verification of the dilution technique used.[38]

6.2.1.2 *Establishment and verification of calibration standards.* The concentration of each calibration standard must have been established by the manufacturer using reliable procedures. Additionally, each calibration standard must have been verified by the manufacturer by one of the following procedures, and the agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent: (1) Verification value determined by comparison with a gas mixture standard generated in a similar manner to the procedure described in section 7.1 of Method 106 for preparing gas mixture standards using 99.9+ percent vinyl chloride, or (2) verification value obtained by having the calibration standard analyzed by the National Bureau of Standards. All calibration standards must be renewed on a time interval consistent with the shelf life of the cylinder standards sold.[38]

7. Procedure.

7.1 Sampling.

7.1.1 PVC sampling—Allow the resin or slurry to flow from a tap on the tank or silo until the tap line has been well purged. Extend a 60 ml sample bottle under the tap, fill, and immediately tightly cap the bottle. Wrap electrical tape around the cap and bottle to prevent the top from loosening. Place an identifying label on each bottle, and record the date, time, and sample location both on the bottles and in a log book.

7.1.2 Water sampling—Prior to use, the 50 ml vials (without the discs) must be capped with aluminum foil and muffled at 400°C for at least one hour to destroy or remove any organic matter that could interfere with analysis. At the sampling location fill the vials bubble-free, to overflowing so that a convex meniscus forms at the top. The excess water is displaced as the sealing disc is carefully placed, Teflon side down, on the opening of the vial. Place the aluminum seal over the disc and the neck of the vial and crimp into place. Affix an identifying label on the bottle, and record the date, time, and sample location both on the vials and in a log book. All samples must be kept refrigerated until analyzed.

7.2 Sample recovery. Samples must be run within 24 hours.

7.2.1 Resin samples—The weight of the resin used must be between 0.1 and 4.5 grams. An exact weight must be obtained (±0.001 gram) for each sample. In the case of suspension resins a volumetric cup can be prepared which will hold the required amount of sample. The sample bottle is opened, and the cup volume of resin is added to the tared sample vial (including septum and aluminum cap). The vial is immediately sealed and the exact sample weight is then obtained. Report this value on the data sheet as it is required for calculation of RVCM. In the case of relatively dry resin samples (water content <0.3 weight %), 100 μl of distilled water must be injected into the vial, after sealing and weighing, using a 100 μl syringe. In the case of dispersion resins, the cup cannot be used. The sample is instead weighed approximately in an aluminum dish, transferred to the tared vial and weighed accurately in the vial. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C.

NOTE: Some aluminum vial caps have a center section which must be removed prior to placing into sample tray. If not removed, serious damage to the injection needle will occur.

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

7.2.2 Suspension resin slurry and wet cake samples—Slurry must be filtered using a small Buchner funnel with vacuum to yield wet cake. The filtering process must be continued only as long as a steady stream of water is exiting from the funnel. Excessive filtration time could result in some loss of VCM. The wet cake sample (0.10 to 4.5 grams) is added to a tared vial (including septum and aluminum cap) and immediately sealed. Sample weight is then determined to 3 decimal places. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C. A sample of wet cake is used to determine TS (total solids). This is required for calculating the RVCM.

7.2.3 Dispersion resin slurry samples.—This material should not be filtered. Sample must be thoroughly mixed. Using a tared vial (including septum and aluminum cap) add approximately 8 drops (0.25 to 0.35 grams) of slurry or latex using a medicine dropper. This should be done immediately after mixing. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 grams. Total sample weight must not exceed 0.50 grams. Condition the vial for one hour at 90°C in the analyzer. Determine the TS on the slurry sample (Section 7.3.5).

7.2.4 Inprocess wastewater samples—Using a tared vial (including septum and aluminum cap) quickly add approximately 1 cc of water using a medicine dropper. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 gram. Condition the vial for two hours at 90°C in the analyzer.

7.3 Analysis.

7.3.1 Preparation of gas chromatograph—Install the chromatographic column and condition overnight at 150°C. Do not connect the exit end of the column to the detector while conditioning.

7.3.1.1 Flow rate adjustments—Adjust flow rates as follows:

a. Nitrogen carrier gas—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to 1.3 kg/cm². Normal flows at this pressure should be 25 to 40 cc/minute. Check with bubble flow meter.

b. Burner air supply—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to supply air to burner at a rate between 250 and 300 cc/minute. Check with bubble flowmeter.

c. Hydrogen supply—Set regulator on cylinder to read 30 psig. Set regulator on chromatograph to supply approximately 35±5 cc/minute. Optimize hydrogen flow to yield the most sensitive detector response without extinguishing the flame. Check flow with bubble meter and record this flow

7.3.1.2 Temperature adjustments—Set temperatures as follows:

a. Oven (chromatographic column), 50° C.

b. Dosing line, 140° C.

c. Injection block, 140° C.

d. Sample chamber, water temperature, 90° C±1.0° C.

7.3.1.3 Ignition of flame ionization detector—Ignite the detector according to the manufacturer's instructions.

7.3.1.4 Amplifier balance—Balance the amplifier according to the manufacturer's instructions.

7.3.2 Programming the chromatograph—Program the chromatograph as follows:

a. I—Dosing time—The normal setting is 2 seconds.

b. A—Analysis time—The normal setting is 8 minutes. Certain types of samples contain high boiling materials which can cause interference wtih the vinyl chloride peak on subsequent analyses. In these cases the analysis time must be adjusted to eliminate the interference. An automated backflush system can also be used to solve this problem.

c. B—Flushing—The normal setting is 0.2 minutes.

d. W—*Stabilization time*. The normal setting is 0.2 minutes.[38]

e. X—Number of analyses per sample—The normal setting is 1.

7.3.3 Preparation of sample turntable—Before placing any sample into turntable, be certain that the center section of the aluminum cap has been removed. The numbered sample bottles should be placed in the corresponding numbered positions in the turntable. Insert samples in the following order:

Positions 1 & 2—Old 2000 ppm standards for conditioning. These are necessary only after the analyzer has not been used for 24 hours or longer.

Position 3—50 ppm standard, freshly prepared.

Position 4—500 ppm standard, freshly prepared.

Position 5—2000 ppm standard, freshly prepared.

Position 6—4000 ppm standard, freshly prepared.

Position 7—Sample No. 7 (This is the first sample of the day, but is given as 7 to be consistent with the turntable and the integrator printout.)

After all samples have been positioned, insert the second set of 50, 500, 2000, and 4000 ppm standards. Samples, including standards must be conditioned in the bath of 90° C for 1 hour (not to exceed 5 hours).

7.3.4 Start chromatograph program—When all samples, including standards, have been conditioned at 90° C for 1 hour, start the analysis program according to the manufacturers' instructions. These instructions must be carefully followed when starting and stopping program to prevent damage to the dosing assembly.

7.3.5 Determination of total solids (TS).

For wet cake, slurry, resin solution, and PVC latex samples, determine TS for each sample by accurately weighing approximately 3 to 4 grams of sample in an aluminum pan before and after placing in a draft oven (105 to 110° C). Samples must be dried to constant weight. After first weighing return the pan to the oven for a short period of time and then reweigh to verify complete dryness. TS is then calculated as the final sample weight divided by initial sample weight.

8. Calibration.

Calibration is to be performed each eight-hour period when the instrument is used. Each day, prior to running samples, the column should be conditioned by running two of the previous days 2000 ppm standards.

8.1 Preparation of Standards.

Calibration standards are prepared by filling the vials with the vinyl chloride/nitrogen standards, rapidly seating the septum and sealing with the aluminum cap. Use a stainless steel line from the cylinder to the vial. Do not use rubber or tygon tubing. The sample line from the cylinder must be purged (into hood) for several minutes prior to filling vials. After purging, reduce the flow rate to approximately 500–1000 cc/min. Place end of tubing into vial (near bottom) and after one minute slowly remove tubing. Place septum in vial as soon as possible to minimize mixing air with sample. After the standard vials are sealed, inject 100μl of distilled water.

8.2 Preparation of chromatograph calibration curve.

Prepare two 50 ppm, two 500 ppm, two 2000 ppm, and two 4000 ppm standard samples. Run the calibration samples in exactly the same manner as regular samples. Plot A_s, the integrator area counts for each standard sample vs C_c, the concentration of vinyl chloride in each standard sample. Draw a line of best fit through the points.

9. Calculations.

9.1 Response factor.

From the calibration curve described in Section 8.2, above, select the value of C_c that corresponds to A_s for each sample. Compute the response factor, R_f, for each sample, as follows:

$$R_f=\frac{A_s}{C_c} \quad \text{Equation 107-1}$$

9.2 Residual vinyl chloride monomer concentration, or vinyl chloride monomer concentration.

Calculate C_{rvc} as follows:

$$C_{rvc}=\frac{A_s P_a}{R_f T_1}\left(\frac{M_v V_g}{m_s R}+K T_2\right)$$

Equation 107-2

where:

C_{rvc} = Concentration of vinyl chloride in the sample, in ppm.

P_a = Laboratory atmosphere pressure, mm Hg.

T_1 = Room temperature, °K.

M_v = Molecular weight of VCM (62.5).

V_g = Volume of vapor phase (vial volume less sample volume).

m_s = Weight of sample, grams.

R = Gas constant [62,360 (cc-mm-mole-degrees Kelvin)]

K = Henry's Law constant. For VCM in PVC at 90° C, $K=6.52\times10^{-6}=K_p$. For VCM in 1 cc (approximate) wastewater sample at 90° C, $K=5.0\times10^{-6}=K_w$.

T_2 = Equilibration temperature, °K.

If the following conditions are met, Equation 107-2 can be simplified as follows:

1. $T_1=22°$ C (295° K)
2. $T_2=90°$ (363° K)
3. $P_a=750$ mm Hg.
4. $V_g=V_v-\frac{m_s}{1.4}=23.5-\frac{m_s}{1.4}$

where

V_v = Vial volume, cc (23.5).

5. Sample contains less than 0.5 percent water.

$$C_{rvc}=\frac{A_s}{R_f}\left(4.197\times10^{-3}+\frac{5.988\times10^{-2}}{m_s}\right) \quad \text{Equation 107-3}$$

The following general equation can be used for any sample which contains VCM, PVC and water.

$$C_{rvc}=\frac{A_s P_a}{R_f T_1}\times\left[\frac{M_v V_g}{R m_s}+K_p(TS)T_2+K_w(1-TS)T_2\right]$$

Equation 107-4

where:

TS = Total solids.

NOTE: K_w must be determined for samples with a vapor volume to liquid volume ratio other than 22.5 to 1. This ratio can be obtained by adjusting the sample weight through giving consideration to the total solids and density of the PVC.

Results calculated using Equation 107–4 represent concentration based on the total sample. To obtain results based on dry PVC content, divide by *TS*.

For a 1-cc wastewater sample (that is, 22.5 to 1 vapor volume to liquid volume ratio), K_w is 5.0×10^{-6}. Thus, Equation 107–4 can be simplified to the following:

$$C_{rvc}=\frac{A_s}{R_f}\left[\frac{5.988\times10^{-2}}{m_s}+(2.066\times10^{-3})\right] \qquad \text{Equation 107–5}$$

(Secs. 112 and 301(a) of the Clean Air Act, 42 U.S.C. 1857c–7 and 1857g(a).)[38]

10. References.

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(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).[40,47]

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Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos, Beryllium, and Mercury

On March 31, 1971 (36 FR 5931), pursuant to section 112 of the Clean Air Act, as amended, the Administrator published an initial list of three hazardous air pollutants which, in his judgment may cause, or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. The pollutants were asbestos, beryllium, and mercury. On December 7, 1971 (36 FR 23239), the Administrator proposed standards for these pollutants.

Interested persons participated in the rulemaking by giving testimony at public hearings and by sending comments to EPA. Public hearings were held in New York City on January 18, 1972, and in Los Angeles on February 15 and 16, 1972. A third hearing, scheduled to be held in Kansas City, on February 1, 1972, was canceled because of a lack of requests to participate. Sixty-eight persons gave testimony at the public hearings, and 56 persons sent comments to EPA. Represented were industries, universities, governmental agencies—Federal, State, and local, and environmental groups. Copies of the public hearing records are available at all EPA Regional Offices and at the Division of Stationary Source Enforcement, room 3220, 401 M Street SW., Washington, D.C. 20460, where copies of the comments received are also available.

The bases for the Administrator's determinations that asbestos, beryllium, and mercury are hazardous, the derivations of the standards now adopted, the Environmental Protection Agency's responses to the significant comments received, and the principal revisions to the proposed standards are summarized below. A more detailed statement is available on request from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, Attention: Mr. Don Goodwin. In addition, the Administrator is issuing information on control techniques for asbestos, beryllium, and mercury as directed by section 112(b)(2) of the act. Copies of these documents may be obtained free of charge from EPA Regional Offices.

ASBESTOS

Asbestos is a hazardous air pollutant within the meaning of section 112. Many persons exposed to asbestos dust developed asbestosis when the dust concentration was high or the duration of exposure was long (*1–7*). A large number of studies have shown that there is an association between occupational exposure to asbestos and a higher-than-expected incidence of bronchial cancer (*8–30*). Asbestos also has been identified as a causal factor in the development of mesotheliomas, cancers of the membranes lining the chest and abdomen (*30–47*). There are reports of mesothelioma associated with nonoccupational exposures in the neighborhood of asbestos sources (*38, 42, 47, 48*). An outstanding feature has been the long period, commonly over 30 years, between the first exposure to asbestos and the appearance of a tumor (*49, 50*). There is evidence which indicates that mesotheliomas occur after much less exposure to asbestos dust than the exposure associated with asbestos (*51, 52*).

It is not practicable, at this time, to establish allowable numerical concentrations or mass emission limits for asbestos. Satisfactory means of measuring ambient asbestos concentrations have only recently been developed, and satisfactory means of measuring asbestos emissions are still unavailable. Even if satisfactory means of measuring asbestos emissions did exist, the previous unavailability of a satisfactory means of measuring ambient levels of asbestos makes it impossible to estimate even roughly the quantitative relationship between asbestos-caused illness and the doses which caused those illnesses. This is a major problem, since some asbestos caused illnesses have a 30-year latency period.

EPA considered the possibility of banning production, processing, and use of asbestos or banning all emissions of asbestos into the atmosphere, but rejected these approaches. The problem of measuring asbestos emissions would make the latter approach impossible to enforce. Either approach would result in the prohibition of many activities which are extremely important; moreover, the available evidence relating to the health hazards of asbestos does not suggest that such prohibition is necessary to protect public health. For example, demolition of any building containing asbestos fireproofing or insulating materials would have to be prohibited as would the use of materials containing even trace amounts of asbestos which could escape into the atmosphere.

Finally, the available evidence suggests a gradient of effects from direct occupational, to indirect occupational exposure, to families of workers exposed to asbestos and persons in the neighborhood of asbestos sources—in all of which situations asbestos concentrations are undoubtedly high by comparison with most community air. This suggests that there are levels of asbestos exposure that will not be associated with any detectable risk, although these levels are not known (*53*).

It is probable that the effects of asbestos inhalation are cumulative; that is, low-level and/or intermittent exposure to asbestos over a long time may be equally as important in the etiology of asbestotic disease as high level and/or continuous exposure over a shorter period. On the other hand, the available evidence does not indicate that levels of asbestos in most community air cause asbestotic disease. Taking both these considerations into account, the Administrator has determined that, in order to provide an ample margin of safety to protect the public health from asbestos, it is necessary to control emissions from major man-made sources of asbestos emissions into the atmosphere, but that it is not necessary to prohibit all emissions.

In this determination, the Administrator has relied on the National Academy of Sciences' report on asbestos (*53*), which concludes: "Asbestos is too important in our technology and economy for its essential use to be stopped. But, because of the known serious effects of uncontrolled inhalation of asbestos minerals in industry and uncertainty as to the shape and character of the dose-response curve in man, it would be highly imprudent to permit additional contamination of the public environment with asbestos. Continued use at minimal risk to the public requires that the major sources of man-made asbestose emission into the atmosphere be defined and controlled."

The means of control used are limitations on visible emissions with an option in some cases to use designated control equipment, requirements that certain procedures be followed, and prohibitions on the use of certain materials or of certain operations. These means of control are required because of the impossibility at this time of prescribing and enforcing allowable numerical concentrations or mass emission limitations known to provide an ample margin of safety. The alternative of no control of the sources subject to this standard was rejected because of the significant health hazard of unregulated emissions of asbestos into the atmosphere from the designated major sources.

It is the Administrator's judgment that the asbestos sources subject to this standard are the major sources of asbestos emissions. In the absence of quantitative emission data, the Administrator's judgment was based on an national inventory of sources and emissions of asbestos (*54*) and other reports (*53, 55*). The asbestos emissions and emission factors presented in the national inventory were based on information obtained from production and reprocessing companies. This information included production figures, estimates of control equipment efficiency and material balances; it did not include emission test results. The major sources of asbestos emissions were considered to fall into five categories: (1) Mining and milling; (2) manufacturing; (3) fabrication; (4) demolition; and (5) spraying. In determining which of these major sources should be covered by the standard promulgated herein, the Administrator considered the effect other Federal regulations will have on the emissions from such sources and the proximity of such sources to the public. In addition, the Administrator considered comments on the proposed standard and additional technical data not available before proposal. The following paragraphs explain these considerations and the changes made to the standard between proposal and final promulgation.

The promulgated standard applies to asbestos mills, selected manufacturing operations, the use of spray-on asbestos

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References at end of article.

materials, demolition operations, and the surfacing of roadways with asbestos tailings. The Administrator will continue to investigate other existing and new sources of asbestos emission and if any of them are found to be major sources, the standard will be revised to cover them.

As applied to mines, the proposed standard would have limited the emissions from drilling operations and prohibited visible emissions of particulate matter from mine roads surfaced with asbestos tailings. The Bureau of Mines has prescribed health and safety regulations (30 CFR 55.5) for the purpose of protecting life, the promotion of health and safety, and the prevention of accidents in open pit metal and nonmetallic mines. As related to asbestos mines, these regulations prohibit persons working in a mine from being exposed to asbestos concentrations which exceed the threshold limit value adopted by the American Conference of Governmental Industrial Hygienists. The regulations specify that respirators shall not be used to prevent persons from being exposed to asbestos where environmental measures are available. For drilling operations, the regulations require that the holes be collared and drilled wet. The regulations recommend that haulage roads, rock transfer points, crushers, and other points where dust (asbestos) is produced sufficient to cause a health or safety hazard be wetted down as often as necessary unless the dust is controlled adequately by other means. In the judgment of the Administrator, implementation of these regulations will prevent asbestos mines from being a major source which must be covered by the standard promulgated herein. Furthermore, the public is sufficiently removed from the mine work environment that their exposure should be significantly less than that of the workers in the work environment. Accordingly, the promulgated standard does not apply to drilling operations or roadways at mine locations.

For asbestos mills, the proposed standard would have applied to ore dumps, open storage areas for asbestos materials, tailings dumps, ore dryers, air for processing ore, air for exhausting particulate material from work areas, and any milling operation which continuously generates inplant visible emissions. The promulgated standard prohibits visible emissions from any part of the mill, but it does not apply to dumps of asbestos tailings or open storage of asbestos ores. The Bureau of Mines' regulations previously referenced and regulations issued by the Occupational Safety and Health Administration (20 CFR 1910.93a) protect workers from the hazards of air contaminants in the work environment. The Occupational Safety and Health Administration regulations were promulgated on June 7, 1972. The regulations are intended to protect the health of employees from asbestos exposure by means of engineering controls (i.e. isolation, enclosures, and dust collection) rather than by personal protective equipment. It is the judgment of the Administrator that measures taken to comply with the Bureau of Mines and Occupational Safety and Health Administration regulations to protect the health of persons who work in proximity to dumps and open storage areas will prevent the dumps and storage areas from being major sources of asbestos emissions.

The proposed standard would have applied to buildings, structures, or facilities within which any fabricating or manufacturing operation is carried on which involves the use of asbestos materials. Comments received on the proposed standard indicated that the requirements for fabricating and manufacturing operations were confusing. Much of the confusion was created by the use of terms such as "any," "continuously," and "forced gas streams." The promulgated standard is more definitive as to applicability of the provisions. The promulgated standard prohibits visible emissions from the nine manufacturing operations which, in the judgment of the Administrator, are major sources of asbestos. The promulgated standard does not cover fabrication operations. Of all fabrication operations, only those operations at new construction sites are considered to be major sources of asbestos emissions. The Occupational Safety and Health Administration regulations specify that all hand- or power-operated tools (i.e. saws, scorers, abrasive wheels, and drills) which produce asbestos dust be provided with dust collection systems. In the judgment of the Administrator, implementation of these regulations will prevent fabrication operations from being a major source which must be covered by the standard promulgated herein.

The proposed standard would have prohibited visible emissions of asbestos particulate material from the repair or demolition of any building or structure other than a single-family dwelling. Comments indicated that the no visible emission requirement would prohibit repair or demolition in many situations, since it would be impracticable, if not impossible, to do such work without creating visible emissions. Accordingly, the promulgated standard specifies certain work practices which must be followed when demolishing certain buildings or structures. The standard covers institutional, industrial, and commercial buildings or structures, including apartment houses having more than four dwelling units, which contain friable asbestos material. This coverage is based on the National Academy of Sciences' report (53) which states, "In general, single-family residential structures contain only small amounts of asbestos insulation. Demolition of industrial and commercial buildings that have been fireproofed with asbestos-containing materials will prove to be an emission source in the future, requiring control measures." Apartment houses with four dwelling units or less are considered to be equivalent to single-family residential structures. The standard requires that the Administrator be notified at least 20 days prior to the commencement of demolition.

The proposed standard would have limited emissions from a number of sources by stipulating that such emissions could not exceed the amounts which would be emitted from the source if the source were equipped with a fabric filter, or, in some cases, a wet-collection air-cleaning device. This would have required a standardized emission-measuring technique, which is not currently available. The promulgated standard prohibits visible emissions which contain asbestos and provides the option of using specified air-cleaning methods. The existence of particulate asbestos material in a gas stream vented to the atmosphere can be determined by collecting a sample on a filter and analyzing it by microscopy techniques. The proposed standard stated that the air-cleaning requirement would not be met if a number of listed faults, e.g., broken bags, leaking gases, threadbare bags, existed and it required that collection hoppers on some baghouses be emptied without generating visible emissions. Comments received suggested that this negative approach tended to make the quality of air-cleaning operations dependent upon the ability of EPA to anticipate and to include in the standard all the factors which would constitute improper methods. Since the intent was, and is, to require high quality air-cleaning operations, the promulgated standard requires proper installation, use, operation, and maintenance without precisely defining the means to be used.

The proposed standard would have prohibited the spraying of any material containing asbestos on any portion of a building or structure, prohibited the spraying of any material containing asbestos in an area directly open to the atmosphere, and limited emissions from all other spraying of any material containing asbestos to the amount which would be emitted if specified air-cleaning equipment were used. Comments received pointed out that this standard would: (1) Prohibit the use of materials containing only the trace amounts of asbestos which occur in numerous natural substances, (2) prohibit the use of materials to which very small quantities of asbestos are added in order to enhance their effectiveness, and (3) prohibit the use of materials in which the asbestos is strongly bound and which would not generate particulate asbestos emissions. The promulgated standard applies to those uses of spray-on asbestos materials which could generate major emissions of particulate asbestos material. For those spray-on materials used to insulate or fireproof buildings, structures, pipes, and conduits, the standard limits the asbestos content to no more than 1 percent. Materials currently used contain from 10- to 80-percent asbestos. The intent of the 1-percent limit is to ban the use of materials which contain significant quantities of asbestos, but to allow the use of materials which would: (1) Contain trace amounts of asbestos which occur in numerous natural substances, and (2) include very small quantities of asbestos (less than 1 percent) added to enhance the material's effectiveness. Although a standardized reference method has not been developed to quantitatively determine the content of asbestos in a material, there are acceptable methods available, based on electron microscopy, which independent laboratories have developed. Determining the asbestos content of a material with these methods costs approximately $300, and the results are accurate within plus or minus 50 percent; these limits on accuracy were taken into account in establishing the 1-percent limitation.

The proposed standard would have prohibited the surfacing of any roadway with asbestos tailings. The promulgated standard applies to all roadways except those on ore deposits; these roadways are temporary, and control measures taken to comply with the Bureau of Mines regulations prevent them from being a major source which must be covered by the standard promulgated herein. At this time, the application of asbestos tailings to public roadways is not widely practiced, but because of the close proximity of roads to the public, a ban on using asbestos tailings on roadways is included in the promulgated standard to avoid a future problem and stop the practice where it is followed. The term "surfacing" is defined to include the deposit of asbestos tailings on roadways covered with snow or ice; therefore, this practice is prohibited.

Consideration was given to including provisions in the standard requiring proper disposal of the asbestos material generated during demolition and collected in control devices used to comply with the requirements of this standard. It was decided that this was not necessary because the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) include housekeeping and waste disposal requirements. These regulations require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers.

The potential environmental impact of the promulgated standard was evaluated, and it was concluded that the standard will not cause any adverse effects. The potentially adverse environmental effects of the standard are:

(1) The asbestos-materials which will be collected in control devices and generated during demolition will have to be disposed of or recycled.

(2) Materials, such as mineral wool, ceramic wool, and fiberglass, will be substituted for asbestos presently contained in spray-applied fireproofing and insulating materials.

In some manufacturing operations, a major portion of the asbestos-material collected, by fabric filters is either recycled to the process or is marketed for other uses. For example, one asbestos textile mill recycles large quantities of longer-fiber asbestos for process use and sells more than 90 percent of the remaining collected materials to a brake lining manufacturer. Consequently, a significant portion of the increased quantities of "waste" asbestos materials which will result from the implementation of the standard will not require disposal. Where disposal is required, the Occupational Safety and Health Administration regulations (29 CFR 1910.93a(h)) require that any asbestos waste, consigned for disposal, be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. The contamination of ground water supplies with asbestos from landfill disposal is not considered a potential problem.

The substitution of ceramic wool, mineral wool, and fiberglass for asbestos is not now known to be a problem. There is no evidence that these materials cause health effects in the concentrations found in occupational or ambient environments.

Although the standard was not based on economic considerations, EPA is aware of the impact (55) and considers it to be reasonable. Costs among the various sources covered by the standard are quite variable. Although the standard may adversely affect some individual plants or companies which are marginal operations, it appears that such effects will be minimal and the impact to the asbestos industries as a whole will not be large.

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BERYLLIUM

Beryllium is a hazardous air pollutant within the meaning of section 112. The proven effects of airborne beryllium materials on human health include both acute and chronic lethal inhalation effects (*1*, *2*), as well as skin and conjunctival effects (*2*). Insufficient data are available to incriminate beryllium as a human carcinogen (*1*, *2*), but the lack of of any mechanism for the total elimination of beryllium body burdens, and the resulting possibly long residence time may enhance the opportunity for cancer induction. The Beryllium Registry now contains over 820 proven cases of beryllium-related disease (*3*), but since many of these were most likely due to exposure prior to the institution of controls, proper assessment of the period of exposure is not always possible (*1*, *2*); it is known, however, that chronic beryllium disease is associated not only with activities involving extraction processes, but also that 64 registry cases resulted from exposure during machining operations on beryllium materials (*3*). There are at least 45 cases of nonoccupationallyincurred diseases on file with the registry, of which approximately half have been fatal (*3*), and retrospective studies of the concentrations of beryllium that resulted in some cases of chronic beryllium disease from nonoccupational exposure have concluded that the lowest concentration which produced disease was greater than 0.01 $\mu g/m^3$ and probably less than 0.10 $\mu g/m^3$ (*4*).

In 1949, when it became apparent that beryllium was a toxic material, the Atomic Energy Commission adopted a limit for beryllium concentrations in community air (i.e., 0.01 μg of beryllium per cubic meter of air averaged over a 30-day period) (2). Beryllium refining companies holding contracts with the AEC to operate AEC-owned refinery facilities and expand their own refinery capacity to meet AEC's beryllium requirements, were required to observe the community air limit. With the termination of these contracts in the 1961–63 period due to a reduction in AEC requirements for beryllium, the refineries were no longer subject to the AEC community air limit. The AEC's health and safety requirements, however, have continued to apply to all AEC-owned facilities, some of which fabricate and assemble beryllium parts.

In the period since the implementation of the AEC guideline, no reported cases of chronic beryllium disease have occurred as a result of community exposure, and the Committee on Toxicology of the National Academy of Sciences concluded that the AEC guideline limit represents a safe level of exposure (*1*).

Accordingly, the Administrator has determined that in order to provide an ample margin of safety to protect the public health from beryllium, sources of beryllium dust, fume, or mist emissions into the atmosphere should be controlled to insure that ambient concentrations of beryllium do not exceed 0.01 $\mu g/m^3$—30-day average.

The beryllium standard covers extraction plants, foundries, ceramic manufacturing plants, machine shops (processing beryllium or beryllium alloys containing in excess of 5 percent beryllium) and disposal of beryllium-containing wastes. Most affected beryllium sources are limited to emissions of not more than 10 grams per day. This level was determined through dispersion estimates as the level which would protect against the occurrence of 30-day average ambient concentrations exceeding 0.01 $\mu g/m^3$. The sources covered by the standard are the only known ones that could result in ambient beryllium concentrations in excess of 0.01 $\mu g/m^3$. The assumptions and equations used to make the dispersion estimates are given in the Background Information Report for Asbestos, Beryllium, and Mercury (APTD–0753), published at the time the standards were proposed.

Rocket testing facilities are required to meet the limit of 75 microgram-minutes per cubic meter, accumulated during any period of 2-consecutive weeks. The limit for rocket testing facilities is the same as that developed in 1966 by the Committee on Toxicology of the National Academy of Sciences for protection of off-site personnel from intermittent exposures to soluble beryllium compounds arising from the firing of rocket motors (*1*).

The proposed standard did not include a provision on open burning of beryllium-containing waste. The promulgated standard includes a ban on open burning of beryllium-containing waste. This change was made because information received after proposal indicated that such sources can cause ambient concentrations of beryllium in excess of 0.01 $\mu g/m^3$ and because it is not possible to control the emissions from open burning. The promulgated standard does allow disposal of beryllium-containing waste in incinerators which are controlled so as not to exceed the 10-gram-per-day limit. The disposal of beryllium-containing explosive waste is included in the standard covering rocket testing.

The proposed standard would have covered all machining operations which use alloys containing any amount of beryllium. Comments were received which claimed that numerous machining operations use alloys containing low concentrations of beryllium and do not exceed the 10-gram-per-day emission limitation. An investigation of these comments revealed that alloys which include beryllium either contain a large amount (greater than 60 percent) or a small amount (less than 5 percent), and that approximately 8,000 machining operations use the low beryllium content alloys. Tests were conducted by the Agency to determine the beryllium emissions from the operations which use the low beryllium content alloys (e.g. stamping, tube drawing, milling, and sawing). The results indicated that even if the emissions were vented to the outside air, which they ordinarily are not, they would be significantly below the 10-gram-per-day emission limitation. After considering these results and the administrative burden if the standard applied to such a large number of sources, the proposed standard was changed to exempt the machining operations which use alloys containing less than 5-percent beryllium.

The proposed standard would have allowed all sources of beryllium to choose between meeting the 10-gram-per-day emission limit and complying by use of ambient monitoring to insure that the 0.01 $\mu g/m^3$ 30-day average is never exceeded. After reconsidering the proposed standard and the difficulty inherent in using ambient air quality data, as opposed to emission data, as a regulatory tool, it was decided to limit the use of ambient data as a means of compliance

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References at end of article.

to those sources which have demonstrated over a reasonable past period that they can meet and have met the ambient limitation. Therefore, the standard being promulgated herein allows the ambient option only to existing sources which have 3 years of current ambient air quality data which demonstrate to the Administrator's satisfaction that the 0.01 $\mu g/m^3$ level can be met in the vicinity of the source. A minimum of 3 years of data was judged to be necessary to demonstrate that the ambient guideline of 0.01 $\mu g/m^3$ (30-day average) can be met because of the possibility of monthly, seasonal, and even annual variations in ambient levels caused by variations in meteorology and production. The existing sources which could qualify or this option are four beryllium extraction plants and, possibly, a small number of machine shops. These sources were designed or modified to facilitate compliance with the 0.01 μg/m ambient limit.

The potential environmental impact of this standard was evaluated and it was concluded that the standard will not cause any adverse effects. Beryllium is a very expensive material, and most gas streams emitting significant quantities of beryllium are controlled with high efficiency dry collectors, and the collected material is recycled or sold back to the primary producers. Wet collectors are rarely used strictly as an air pollution control device, but more often as an extraction process control device allowing recycle of waste liquids to the process. Absolute filters are often used as final filters and collect small quantities of beryllium from very low concentration gas streams. These filters are usually buried in company owned or segregated dumps or stored in unused mines or buildings. Most of the solid wastes are prepackaged prior to burial to prevent escape of beryllium to the environment.

Although the standard is not based on economic considerations, EPA is aware of the economic impact (*5*) of the standard. Since most of the sources of beryllium emissions are already controlled and in compliance with the standard, the economic impact will be very small.

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MERCURY

Mercury is a hazardous air pollutant within the meaning of section 112. Exposure to metallic mercury vapors may cause central nervous system injury, and renal damage (*1*, *3*). Experience with mercury vapor comes almost exclusively from animal experiments and industrial exposures. Animal (rat) data indicate a risk of accumulation in critical systems upon prolonged exposure, with a potential, for example, for selective brain damage (*2*, *3*). Prolonged exposure to about 100 micrograms mercury per cubic meter of air involves a definite risk of mercury intoxication (*3*).

To determine the ambient air level of mercury that does not impair health, the airborne burden must be considered together with the water- and food-borne burdens. An expert group concluded, based on its analysis of several episodes of mercury poisoning in Japan, that 4 micrograms of methylmercury per kilogram of bodyweight per day would result in the intoxication of a sensitive adult; application of a safety factor of 10 yielded an acceptable exposure of about 30 micrograms per day for a 70-kilogram man, and this level is also believed to provide satisfactory protection against genetic lesions, and poisoning of the fetus and of children (*4*).

It should be noted that methylmercury is considered to be by far the most hazardous mercury compound, particularly via the ingestion of fish in which it has been concentrated through the food chain, (*3*, *5*). The Environmental Protection Agency, in view of the present limited knowledge as to the effects of inhaled mercury in the general population, and in order to best assure the requisite "ample margin of safety to protect the public health," has concluded that it is prudent to consider exposures to methylmercury (diet) and mercury vapor (air) to be equivalent and additive. It has been estimated that from average diets, over a considerable period, mercury intakes of 10 micrograms per day may be expected (*6*), so that, in order to restrict total intake to 30 micrograms per day, the average mercury intake from air would have to be limited to 20 micrograms per day. Assuming inhalation of 20 cubic meters of air per day, the air could contain an average daily concentration of no more than 1 microgram of mercury per cubic meter.

The standard promulgated herein regulates the only two sources, mercury ore processing facilities and mercury cell chlor-alkali plants, which have been found to emit mercury in a manner that could cause the ambient concentration to exceed the inhalation effects limits of 1 microgram per cubic meter. The standard limits emissions from these facilities to not more than 2,300 grams per day. The emission limit of 2,300 grams per day was derived from dispersion estimates as the level which would protect against the violation of an average daily ambient concentration of 1 microgram per cubic meter. The assumptions and equations used to make the dispersion estimates are given in the Background Information Report for Asbestos, Beryllium, and Mercury (APTD-0753), published at the time the standards were proposed.

Many mercury cell chlor-alkali plant cell rooms present severe source testing problems due to their design and construction. Such sources may either reconstruct the cell room so that accurate source tests can be made or employ housekeeping and maintenance practices that minimize mercury emissions from the cell room. Source test data and calculations have indicated that when such practices are used, 1,300 grams per day is a reasonable estimate of emissions from the cell room. Therefore, when this option is chosen, an emission of 1,300 grams per day will be assigned to the cell room. This permits emissions of not more than 1,000 grams per day from the hydrogen and end box ventilation streams combined.

Compliance with the standard will be determined by the EPA reference method or EPA-approved substitute methods. Where a chlor-alkali plant chooses the housekeeping and maintenance practices option, determination of compliance of the cell room emission will be based on the use of EPA-approved practices. A list of approved practices may be obtained from EPA on request to regional offices.

The only major change in the mercury standard is the introduction of the above option of assigning an emission number to the cell room provided certain housekeeping and maintenance requirements are met. When this option is chosen, testing is not required for emissions from the cell room. This option is offered because comments, testimony, and EPA source testing experience indicated that most existing cell rooms cannot be accurately tested for mercury emissions. Accurate emission tests are unduly complicated and costly because of the cell room configuration.

Some of the changes suggested in written comments and public hearing testimony were considered by EPA but not made. The most significant one involved the environmental chemistry of mercury, that is, environmental mercury in the atmosphere is transformed to mercuric oxide by the action of ultraviolet radiation, and since mercuric oxide is not as toxic as elemental mercury, the standard should be less stringent. This argument is based on laboratory experiments under controlled conditions with generated radiation. The reaction cited in the testimony occurs when elemental mercury is irradiated with ultraviolet light with a wavelength of 2,537 angstrom (A). Naturally occurring ozone in the upper atmosphere absorbs light in the ultraviolet region below 3,000 A; (*7*) hence the wavelength of ultraviolet necessary for the reaction is absent in the ambient atmosphere, and the reaction does not proceed at as high a rate as implied by the submitted testimony. Field measurements of both mercury vapors and particulate mercury in ambient air indicate that as much as 96 percent of the mercury de-

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tected was in an elemental vapor form (data collected by EPA at the Federal Building in Moundsville, W. Va.).

The Environmental Protection Agency recognizes that mercury and its compounds constitute a multimedia contamination problem, i.e., strong evidence alter its natural distribution in the environment; that such uses may cause or hasten additional deposits into water or soil over and above those occurring naturally, thereby building up environmental concentrations; and the mercury levels accumulate in the biota, with the result that potentially dangerous residue levels are reached in foods consumed by man and animals.

Current data on the environmental transport of mercury do not permit a clear assessment of the effect of mercury emissions into the atmosphere on the mercury content in the aquatic and terrestrial environments. Results of ongoing research will determine if there is a need for more comprehensive control of mercury emissions into the air. The standard promulgated herein is intended to protect the public health from the effects of inhaled mercury.

The environmental impact of this standard was evaluated and it was concluded that the standard will not cause any adverse effects since the control of mercury emissions to the atmosphere will have only minimal impact on other areas of environmental concern. The simplest control for mercury emissions to the atmosphere is cooling to condense the mercury. This cooling can be indirect or direct. By indirect cooling, the mercury condenses and is retained for recycle or sale. By direct cooling with a water scrubber, the water is usually recirculated after using centrifugal or gravitational separation to remove the mercury. The water cannot be reused indefinitely and eventually requires additional treatment to remove the mercury. In most cases, such treatment facilities are already being utilized to meet water quality standards.

A widely used control device for particulate mercury emissions is the mist eliminator. Residues in these devices are removed by gravity and washing with a recycled liquid. Another control method is chemical scrubbing. In this system, scrubbing liquids are continuously made up while waste materials are usually recycled to the process feed solutions. Recycling of these liquids avoids significant contamination of water with mercury residues.

The use of adsorption beds is a highly efficient control method for removing mercury from gas streams. Two primary types are available: (1) Chemically treated activated carbon beds, and (2) molecular sieves. Most of the mercury collected by activated carbon can be reclaimed by retorting the carbon but this usually destroys the carbon structure and necessitates disposal. Some small amount of residual mercury will remain with the carbon, but it is tightly bound and is not easily transferred into the air or water. Regenerative molecular sieves do not cause a waste disposal problem because the sieves can be regenerated in place without retorting and can be reused many times.

Although the standard was not based on economic considerations, EPA is aware of the impact (8) and considers it to be reasonable. Because mercury is an international commodity, world prices determine the fortunes of the domestic mercury mining industry. Historically, mercury prices fluctuate greatly in response to small changes in demand or supply. Domestic mercury mines are considered high-cost producers in relation to foreign producers. Because the average price has dropped from $404 per flask in 1969 to approximately $320 currently, the number of domestic mercury mines in operation has dropped sharply from 109 in 1969 to six or seven in March 1973. As long as the price of mercury remains below marginal costs of production (generally about $400), the remaining domestic mines will be ill equipped to absorb any cost increases.

The total chlor-alkali industry comprises 68 plants. Approximately 28 are mercury cell plants and account for about 27 percent of the U.S. production of chlorine and caustic.

The future of the chlorine-caustic industry appears healthy. Demand for chlorine is expected to grow at an annual rate of 6 percent projected from 1971. Demand for caustic soda will grow at least at the same rate as chlorine, and perhaps faster. Prices for chlorine and sodium hydroxide have been rising steadily through the sixties into 1971. Based on these trends, the cost of control to comply with the mercury standard will be passed forward to the consumer. Use of these two basic commodities is so diverse that any price increases will be well dispersed through all manufacturing activities.

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GENERAL PROVISIONS

The standards promulgated below are applicable to new, modified, and existing sources. Any new or modified source must comply with the standards upon beginning operation. Any existing source must comply with the standards within 90 days after promulgation, unless a waiver of compliance is granted.

After considering the proposed general provisions and the comments received on them, the Administrator made several changes which are included in the standards promulgated below. A new section was added to specifically require new stationary sources to notify the Administrator before beginnning operation. The requirements for source reporting and request for waiver of compliance were combined into one section. The time for submitting the source report was extended from 30 to 90 days to provide sources with more time to complete the information required. Appendix A was added to provide sources a description and format of the information required.

The proposed standards required all sources of mercury and beryllium to test their emissions within 3 months of the effective date and at least once every 3 months thereafter; a provision was included to allow the Administrator to waive the periodic tests for sources in compliance with a standard. The standards promulgated below require the initial test within 90 days of the effective date and include a provision to allow the Administrator to waive this requirement if the source is meeting the standard or has requested a waiver of compliance. Periodic tests are not required unless specifically requested by the Administrator. The Administrator may cancel a waiver of emission tests and may require a test under the authority of section 114 of the Act at any time. Appendix A specifies the information which a source must provide the Administrator when applying for a waiver of initial emission testing.

The standards promulgated below do not require the owner or operator to request a waiver of compliance before a specific date. However, the owner or operator should submit the request within 30 days after the effective date of the regulation to be assured that action will be taken on the waiver application prior to the 90th day after the effective date. Continued operation in excess of a standard after the 90th day without a waiver is a violation of the act.

The Administrator may grant an existing source a waiver, permitting a period of up to 2 years for compliance, provided that steps will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment and provided that such period is necessary for the installation of controls. To be granted a waiver of compliance, a source must submit a written request to the Administrator and provide certain information to assist the Administrator in making a judgment.

Within 60 days after receiving a request, the Administrator will notify the owner or operator of approval or intention to deny the waiver. Any waiver of compliance granted by the Administrator will be in writing and specify conditions the source must meet during the waiver period. If the Administrator intends to deny a request, the owner or operator will be given a specified time to provide additional information or arguments prior to final action on the request. Final action on a request will be in writing by the Administrator, and if denied, will include reasons for denial.

The President may exempt any new, modified, or existing stationary source from compliance with the standards for a period of up to 2 years, provided the technology is not available to implement the standards and the operation of such source is required for reasons of national security. Also, the President may grant exemptions for additional periods of 2 years or less.

The construction of a new source or modification of an existing source covered by these standards cannot begin without approval of the Administrator. To obtain approval, the owner or operator of such sources must apply in writing to the Administrator. Within 60 days, the Administrator will notify the owner or operator of approval or intention to deny approval. If the Administrator intends to deny approval, a specified time will be given to provide additional information or arguments prior to final action on the application. The final action on any application will be in writing by the Administrator, and if denied, will include the reasons for denial.

Although the demolition of buildings or structures containing asbestos material and the spraying of asbestos material will in many cases be modifications of existing stationary sources, the Administrator's approval is not required before beginning such operations. Section 112(c)(1) of the act specifies that no person may construct any new source or modify any existing source "* * * unless the Administrator finds that such source if properly operated will not cause emissions in violation of such standard." The demolition and spraying provisions are expressed in terms of procedures to be followed. Therefore, if the source is properly operated, it will be complying with the standard, and there is no need for the Administrator to make a finding with respect to each new source subject to these provisions.

Each source covered by these standards is required to submit to the Administrator within 90 days after promulgation certain information pertaining to its operation. Changes in the information must be submitted within 30 days after the change, except where the change is considered a modification. Then the requirements for a modified source are applicable.

Three terms are associated with determining compliance by means of source testing: (1) Reference method, (2) equivalent method, and (3) alternative method. Reference methods are the preferred methods of sampling and analyzing used to determine compliance. The reference methods for beryllium and mercury are included in appendix B to this part. An equivalent method is any method of sampling and analyzing which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method under specified conditions. An alternative method is any method of sampling and analyzing which does not meet all the criteria for equivalency but which can be used in specific cases to determine compliance. Alternative methods may be approved by the Administrator for source testing; however, in cases where determinations of compliance using an alternative method are disputed, use of the reference method or its equivalent will be required by the Administrator. An approved alternative method for beryllium is included in appendix B hereto.

All emission data provided to or obtained by the Administrator in carrying out these regulations will be available to the public. Records, reports, or information other than trade secrets will be available to the public.

Pursuant to section 112(d)(1) of the act, the Environmental Protection Agency intends to delegate the authority to implement and enforce national emission standards (except with respect to stationary sources owned or operated by the United States) for hazardous air pollutants to any State which submits an adequate procedure to the Administrator. The requisite procedure for requesting such delegation will be issued in the future by the Environmental Protection Agency.

The regulations for the national emission standards for asbestos, beryllium, and mercury are hereby promulgated effective upon promulgation (April 6, 1973).

Dated: March 30, 1973.

Robert W. Fri,
Acting Administrator,
Environmental Protection Agency.

A new Part 61 is added to Chapter I, Title 40, Code of Federal Regulations, as follows:

Subpart A—General Provisions

Sec.
61.01 Applicability.
61.02 Definitions.
61.03 Abbreviations.
61.04 Address.
61.05 Prohibited activities.
61.06 Determination of construction or modification.
61.07 Application for approval of construction or modification.
61.08 Approval by Administrator.
61.09 Notification of startup.
61.10 Source reporting and waiver request.
61.11 Waiver of compliance.
61.12 Emission tests and monitoring.
61.13 Waiver of emission tests.
61.14 Source test and analytical methods.
61.15 Availability of information.
61.16 State authority.

Subpart B—National Emission Standard for Asbestos

61.20 Applicability.
61.21 Definitions.

Sec.
61.22 Emission standard.
61.23 Air cleaning.
61.24 Reporting.

Subpart C—National Emission Standard for Beryllium

61.30 Applicability.
61.31 Definitions.
61.32 Emission standard.
61.33 Stack sampling.
61.34 Air sampling.

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

61.40 Applicability.
61.41 Definitions.
61.42 Emission standard.
61.43 Emission testing—rocket firing or propellant disposal.
61.44 Stack sampling.

Subpart E—National Emission Standard for Mercury

61.50 Applicability.
61.51 Definitions.
61.52 Emission standard.
61.53 Stack sampling.

Appendix A—Compliance Status Information.
Appendix B—Test Methods.
Method 101—Reference method for determination of particulate and gaseous mercury emissions from stationary sources (air streams).
Method 102—Reference method for determination of particulate and gaseous mercury emissions from stationary sources (hydrogen streams).
Method 103—Beryllium screening method.
Method 104—Reference method for determination of beryllium emissions from stationary sources.

Authority: 42 U.S.C. 1857c-7.

Subpart A—General Provisions

§ 61.01 Applicability.

The provisions of this part apply to the owner or operator of any stationary source for which a standard is prescribed under this part.

§ 61.02 Definitions.

As used in this part, all terms not defined herein shall have the meaning given them in the act:

(a) "Act" means the Clean Air Act (42 U.S.C. 1857 et seq.).

(b) "Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

(c) "Alternative method" means any method of sampling and analyzing for an air pollutant which does not meet all of the criteria for equivalency but which has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for his determination of compliance.

(d) "Commenced" means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

(e) "Compliance schedule" means the date or dates by which a source or category of sources is required to comply with the standards of this part and with any steps toward such compliance which are set forth in a waiver of compliance under § 61.11.

(f) "Construction" means fabrication, erection, or installation of a stationary source.

(g) "Effective date" is the date of promulgation in the FEDERAL REGISTER of an applicable standard or other regulation under this part.

(h) "Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

(i) "Existing source" means any stationary source which is not a new source.

(j) "Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that:

(1) Routine maintenance, repair, and replacement shall not be considered physical changes, and

(2) The following shall not be considered a change in the method of operation:

(i) An increase in the production rate, if such increase does not exceed the operating design capacity of the stationary source;

(ii) An increase in hours of operation.

(k) "New source" means any stationary source, the construction or modification of which is commenced after the publication in the FEDERAL REGISTER of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

(l) "Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

(m) "Reference method" means any method of sampling and analyzing for an air pollutant, as described in appendix B to this part.

(n) "Startup" means the setting in operation of a stationary source for any purpose.

(o) "Standard" means a national emission standard for a hazardous air pollutant proposed or promulgated under this part.

(p) "Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator.

§ 61.03 Abbreviations.

The abbreviations used in this part have the following meanings:

°C—Degrees Centigrade.
cfm—Cubic feet per minute.
ft^2—Square feet.
ft^3—Cubic feet.
°F—Degrees Fahrenheit.
in—Inch.
l—Liter.
ml—Milliliter.
M—Molar.
m^3—Cubic meter.
nm—Nanometer.
oz—Ounces.
v/v—Volume per volume.
yd^2—Square yards.
w.g.—Water gage.
inHg—Inches of mercury.
inH$_2$O—Inches of water.
g—Grams.
mg—Milligrams.
N—Normal.
°R—Degree Rankine.
min—Minute
sec—Second.
avg.—Average.
I.D.—Inside diameter.
O.D.—Outside diameter.
µg—Micrograms (10^{-6} gram).
%—Percent.
Hg—Mercury.
Be—Beryllium.

§ 61.04 Address.

All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate regional office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Mass. 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pa. 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Ga. 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Ill. 60606.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson Street, Dallas, Tex. 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 1735 Baltimore Street, Kansas City, Mo. 64108.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 916 Lincoln Towers, 1860 Lincoln Street, Denver, Colo. 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, Calif. 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Wash. 98101.

§ 61.05 Prohibited activities.

(a) After the effective date of any standard prescribed under this part, no owner or operator shall construct or modify any stationary source subject to such standard without first obtaining written approval of the Administrator in accordance with this subpart, except under an exemption granted by the President under section 112(c)(2) of the act. Sources, the construction or modification of which commenced after the publication date of the standards proposed to be applicable to such source, are subject to this prohibition.

(b) After the effective date of any standard prescribed under this part, no owner or operator shall operate any new source in violation of such standard except under an exemption granted by the President under section 112(c)(2) of the act.

(c) Ninety days after the effective date of any standard prescribed under this part, no owner or operator shall operate any existing stationary source in violation of such standard, except under a waiver granted by the Administrator in accordance with this subpart or under an exemption granted by the President under section 112(c)(2) of the act.

(d) No owner or operator subject to the provisions of this part shall fail to report, revise reports, or report source test results as required under this part.

§ 61.06 Determination of construction or modification.

Upon written application by an owner or operator, the Administrator will make a determination of whether actions taken or intended to be taken by such owner or operator constitute construction or modification or the commencement thereof within the meaning of this part. The Administrator will within 30 days of receipt of sufficient information to evaluate an application, notify the owner or operator of his determination.

§ 61.07 Application for approval of construction or modification.

(a) The owner or operator of any new source to which a standard prescribed under this part is applicable shall, prior to the date on which construction or modification is planned to commence, or within 30 days after the effective date in the case of a new source that already has commenced construction or modification and has not begun operation, submit to the Administrator an application for approval of such construction or modification. A separate application shall be submitted for each stationary source.

(b) Each application shall include:

(1) The name and address of the applicant.

(2) The location or proposed location of the source.

(3) Technical information describing the proposed nature, size, design, operating design capacity, and method of operation of the source, including a description of any equipment to be used for control of emissions. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of such calculations.

§ 61.08 Approval by Administrator.

(a) The Administrator will, within 60 days of receipt of sufficient information to evaluate an application under § 61.07, notify the owner or operator of approval or intention to deny approval of construction or modification.

(b) If the Administrator determines that a stationary source for which an application pursuant to § 61.07 was submitted will, if properly operated, not cause emissions in violation of a standard, he will approve the construction or modification of such source.

(c) Prior to denying any application for approval of construction or modification pursuant to this section, the Administrator will notify the owner or operator making such application of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator shall specify, additional information or arguments to the Administrator prior to final action on such application.

(d) A final determination to deny any application for approval will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days of presentation of additional information or arguments, or 60 days after the final date specified for presentation, if no presentation is made.

(e) Neither the submission of an application for approval nor the Administrator's granting of approval to construct or modify shall:

(1) Relieve an owner or operator of legal responsibility for compliance with any applicable provision of this part or of any other applicable Federal, State, or local requirement, or

(2) Prevent the Administrator from implementing or enforcing this part or taking any other action under the act.

§ 61.09 Notification of startup.

(a) Any owner or operator of a source which has an initial startup after the effective date of a standard prescribed under this part shall furnish the Administrator written notification as follows:

(1) A notification of the anticipated date of initial startup of the source not more than 60 days nor less than 30 days prior to such date.

(2) A notification of the actual date of initial startup of the source within 15 days after such date.

§ 61.10 Source reporting and waiver request.

(a) The owner or operator of any existing source, or any new source to which a standard prescribed under this part is applicable which had an initial startup which preceded the effective date of a standard prescribed under this part shall, within 90 days after the effective date, provide the following information in writing to the Administrator:

(1) Name and address of the owner or operator.

(2) The location of the source.

(3) The type of hazardous pollutants emitted by the stationary source.

(4) A brief description of the nature, size, design, and method of operation of the stationary source including the operating design capacity of such source. Identify each point of emission for each hazardous pollutant.

(5) The average weight per month of the hazardous materials being processed by the source, over the last 12 months preceding the date of the report.

(6) A description of the existing control equipment for each emission point.

(i) Primary control device(s) for each hazardous pollutant.

(ii) Secondary control device(s) for each hazardous pollutant.

(iii) Estimated control efficiency (percent) for each control device.

(7) A statement by the owner or operator of the source as to whether he can comply with the standards prescribed in this part within 90 days of the effective date.

(b) The owner or operator of an existing source unable to operate in compliance with any standard prescribed under this part may request a waiver of compliance with such standard for a period not exceeding 2 years from the effective date. Any request shall be in writing and shall include the following information:

(1) A description of the controls to be installed to comply with the standard.

(2) A compliance schedule, including the date each step toward compliance will be reached. Such list shall include as a minimum the following dates:

(i) Date by which contracts for emission control systems or process modifications will be awarded, or date by which orders will be issued for the purchase of component parts to accomplish emission control or process modification;

(ii) Date of initiation of onsite construction or installation of emission control equipment or process change;

(iii) Date by which onsite construction or installation of emission control equipment or process modification is to be completed; and

(iv) Date by which final compliance is to be achieved.

(3) A description of interim emission control steps which will be taken during the waiver period.

(c) Changes in the information provided under paragraph (a) of this section shall be provided to the Administrator within 30 days after such change, except that if changes will result from modification of the source, as defined in § 61.02 (j), the provisions of § 61.07 and § 61.08 are applicable.

(d) The format for reporting under this section is included as appendix A of this part. Advice on reporting the status of compliance may be obtained from the Administrator.

§ 61.11 Waiver of compliance.

(a) Based on the information provided in any request under § 61.10, or other information, the Administrator may grant a waiver of compliance with a standard for a period not exceeding 2 years from the effective date of such standard.

(b) Such waiver will be in writing and will:

(1) Identify the stationary source covered.

(2) Specify the termination date of the waiver. The waiver may be terminated at an earlier date if the conditions specified under paragraph (b)(3) of this section are not met.

(3) Specify dates by which steps toward compliance are to be taken; and impose such additional conditions as the Administrator determines to be necessary to assure installation of the necessary controls within the waiver period, and to assure protection of the health of persons during the waiver period.

(c) Prior to denying any request for a waiver pursuant to this section, the Administrator will notify the owner or operator making such request of the Administrator's intention to issue such denial, together with:

(1) Notice of the information and findings on which such intended denial is based, and

(2) Notice of opportunity for such owner or operator to present, within such time limit as the Administrator specifies, additional information or arguments to the Administrator prior to final action on such request.

(d) A final determination to deny any request for a waiver will be in writing and will set forth the specific grounds on which such denial is based. Such final determination will be made within 60 days after presentation of additional information or arguments, or 60 days after the final date specified for such presentation, if no presentation is made.

(e) The granting of a waiver under this section shall not abrogate the Administrator's authority under section 114 of the act.

§ 61.12 Emission tests and monitoring.

(a) Emission tests and monitoring shall be conducted and reported as set forth in this part and appendix B to this part.

(b) The owner or operator of a new source subject to this part, and at the request of the Administrator, the owner or operator of an existing source subject to this part, shall provide or cause to be provided, emission testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such source.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

§ 61.13 Waiver of emission tests.

(a) Emission tests may be waived upon written application to the Administrator if, in his judgment, the source is meeting the standard, or if the source is operating under a waiver of compliance or has requested a waiver of compliance.

(b) If application for waiver of the emission test is made, such application shall accompany the information required by § 61.10. The appropriate form is contained in appendix A to this part.

(c) Approval of any waiver granted pursuant to this section shall not abrogate the Administrator's authority under the act or in any way prohibit the Administrator from later canceling such waiver. Such cancellation will be made only after notice is given to the owner or operator of the source.

§ 61.14 Source test and analytical methods.

(a) Methods 101, 102, and 104 in appendix B to this part shall be used for all source tests required under this part, unless an equivalent method or an alternative method has been approved by the Administrator.

(b) Method 103 in appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.32(a) and § 61.42 (b).

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraph (a) or (b) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.

§ 61.15 Availability of information.

(a) Emission data provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public.

(b) Any records, reports, or information, other than emission data, provided to, or otherwise obtained by, the Administrator in accordance with the provisions of this part shall be available to the public, except that upon a showing satisfactory to the Administrator by any person that such records, reports, or information, or particular part thereof (other than emission data), if made public, would divulge methods or processes entitled to protection as trade secrets of such person, the Administrator will consider such records, reports, or information, or particular part thereof, confidential in accordance with the purposes of section 1905 of title 18 of the United States Code, except that such records, reports, or information, or particular part thereof, may be disclosed to other officers, employees, or authorized representatives of the United States concerned with carrying out the provisions of the act or when relevant in any proceeding under the act.

§ 61.16 State authority.

(a) The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

(1) Adopting and enforcing any emission limiting regulation applicable to a stationary source, provided that such emission limiting regulation is not less stringent than the standards prescribed under this part.

(2) Requiring the owner or operator of a stationary source, other than a stationary source owned or operated by the United States, to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such source.

Subpart B—National Emission Standard for Asbestos

§ 61.20 Applicability.

The provisions of this subpart are applicable to those sources specified in § 61.22.

§ 61.21 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Asbestos" means actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite.

(b) "Asbestos material" means asbestos or any material containing asbestos.

(c) "Particulate asbestos material" means finely divided particles of asbestos material.

(d) "Asbestos tailings" means any solid waste product of asbestos mining or milling operations which contains asbestos.

(e) "Outside air" means the air outside buildings and structures.

(f) "Visible emissions" means any emissions which are visually detectable without the aid of instruments and which contain particulate asbestos material.

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section. Outside storage of asbestos materials is not considered a part of an asbestos mill.

(b) Roadways: The surfacing of roadways with asbestos tailings is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings on roadways covered with snow or ice is considered "surfacing."

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any building or structure in which the following operations are conducted or directly from any of the following operations if they are conducted outside of buildings or structures:

(1) The manufacture of cloth, cord, wicks, tubing, tape, twine, rope, thread, yarn, roving, lap, or other textile materials.

(2) The manufacture of cement products.

(3) The manufacture of fireproofing and insulating materials.

(4) The manufacture of friction products.

(5) The manufacture of paper, millboard, and felt.

(6) The manufacture of floor tile.

(7) The manufacture of paints, coatings, caulks, adhesives, sealants.

(8) The manufacture of plastics and rubber materials.

(9) The manufacture of chlorine.

(d) Demolition: Any owner or operator of a demolition operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any boiler, pipe, or load-supporting structural member that is insulated or fireproofed with friable asbestos material shall comply with the requirements set forth in this paragraph.

(1) Notice of intention to demolish shall be provided to the Administrator at least 20 days prior to commencement of such demolition or anytime prior to commencement of demolition subject to paragraph (d)(4) of this section.

Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished.

(iv) Address or location of the building, structure, facility or installation.

(v) Scheduled starting and completion dates of demolition.

(vi) Method of demolition to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph.

(2) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any boiler, pipe, or load-supporting structural member, shall be wetted and removed from any building, structure, facility, or installation subject to this paragraph before wrecking of load-supporting structural members is commenced. The friable asbestos debris shall be wetted adequately to insure that such debris remains wet during all stages of demolition and related handling operations.

(ii) No pipe or load-supporting structural member that is covered with friable asbestos insulating or fireproofing material shall be dropped or thrown to the ground from any building, structure, facility, or installation subject to this paragraph, but shall be carefully lowered or taken to ground level.

(iii) No friable asbestos debris shall be dropped or thrown to the ground from any building, structure, facility, or installation subject to this paragraph or from any floor to any floor below. For buildings, structures, facilities, or installations, 50 feet or greater in height, friable asbestos debris shall be transported to the ground via dust-tight chutes or containers.

(3) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(4) Any owner or operator of a demolition operation who intends to demolish a building, structure, facility, or installation to which the provisions of this paragraph would be applicable but which has been declared by proper State or local authority to be structurally unsound and which is in danger of imminent collapse is exempt from the requirements of this paragraph other than the reporting requirements specified by paragraph (d)(1) of this section and the wetting of friable asbestos debris as specified by paragraph (d)(2)(i) of this section.

(e) Spraying: There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbestos, on a dry weight basis, used to insulate or fireproof equipment and machinery, except as provided in paragraph (f) of this section. Spray-on materials used to insulate or fireproof buildings, structures, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.

(1) Sources subject to this paragraph are exempt from the requirements of § 61.05(a), § 61.07, and § 61.09.

(2) Any owner or operator who intends to spray asbestos materials to insulate or fireproof buildings, structures, pipes, conduits, equipment, and machinery shall report such intention to the administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Location of spraying operation.

(iv) Procedures to be followed to meet the requirements of this paragraph.

(f) Rather than meet the no-visible-emission requirements of paragraphs (a), (c), and (e) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

§ 61.23 Air-cleaning.

If air-cleaning is elected, as permitted by § 61.22(f), the requirements of this section must be met.

(a) Fabric filter collection devices must be used, except as noted in paragraphs (b) and (c) of this section. Such devices must be operated at a pressure drop of no more than 4 inches water gage, as measured across the filter fabric. The airflow permeability, as determined by ASTM method D737-69, must not exceed 30 $ft^3/min/ft^2$ for woven fabrics or 35 $ft^3/min/ft^2$ for felted fabrics, except that 40 $ft^3/min/ft^2$ for woven and 45 $ft^3/min/ft^2$ for felted fabrics is allowed for filtering air from asbestos ore dryers. Each square yard of felted fabric must weigh at least 14 ounces and be at least one-sixteenth inch thick throughout. Synthetic fabrics must not contain fill yarn other than that which is spun.

(b) If the use of fabric filters creates a fire or explosion hazard, the administrator may authorize the use of wet collectors designed to operate with a unit contacting energy of at least 40 inches water gage pressure.

(c) The administrator may authorize the use of filtering equipment other than that described in paragraphs (a) and (b) of this section if the owner or operator demonstrates to the satisfaction of the administrator that the filtering of particulate asbestos material is equivalent to that of the described equipment.

(d) All air-cleaning equipment authorized by this section must be properly installed, used, operated, and maintained. Bypass devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos material.

§ 61.24 Reporting.

The owner or operator of any existing source to which this subpart is applicable shall, within 90 days after the effective date, provide the following information to the administrator:

(a) A description of the emission control equipment used for each process;

(b) If a fabric filter device is used to control emissions, the pressure drop across the fabric filter in inches water gage.

(1) If the fabric filter device utilizes a woven fabric, the airflow permeability in $ft^3/min/ft^2$; and, if the fabric is synthetic, indicate whether the fill yarn is spun or not spun.

(2) If the fabric filter device utilizes a felted fabric, the density in oz/yd^2, the minimum thickness in inches, and the airflow permeability in $ft^3/min/ft^2$.

(c) Such information shall accompany the information required by § 61.10. The appropriate form is contained in appendix A to this part.

Subpart C—National Emission Standard for Beryllium

§ 61.30 Applicability.

The provisions of this subpart are applicable to the following stationary sources:

(a) Extraction plants, ceramic plants, foundries, incinerators, and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys, or beryllium-containing waste.

(b) Machine shops which process beryllium, beryllium oxides, or any alloy when such alloy contains more than 5 percent beryllium by weight.

§ 61.31 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Beryllium" means the element beryllium. Where weights or concentrations are specified, such weights or concentrations apply to beryllium only, excluding the weight or concentration of any associated elements.

(b) "Extraction plant" means a facility chemically processing beryllium ore to beryllium metal, alloy, or oxide, or performing any of the intermediate steps in these processes.

(c) "Beryllium ore" means any naturally occurring material mined or gathered for its beryllium content.

(d) "Machine shop" means a facility performing cutting, grinding, turning, honing, milling, deburring, lapping, electrochemical machining, etching, or other similar operations.

(e) "Ceramic plant" means a manufacturing plant producing ceramic items.

(f) "Foundry" means a facility engaged in the melting or casting of beryllium metal or alloy.

(g) "Beryllium-containing waste" means material contaminated with beryllium and/or beryllium compounds used or generated during any process or operation performed by a source subject to this subpart.

(h) "Incinerator" means any furnace used in the process of burning waste for the primary purpose of reducing the volume of the waste by removing combustible matter.

(i) "Propellant" means a fuel and oxidizer physically or chemically combined which undergoes combustion to provide rocket propulsion.

(j) "Beryllium alloy" means any metal to which beryllium has been added in order to increase its beryllium content and which contains more than 0.1 percent beryllium by weight.

(k) "Propellant plant" means any facility engaged in the mixing, casting, or machining of propellant.

§ 61.32 Emission standard.

(a) Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 10 grams of beryllium over a 24-hour period, except as provided in paragraph (b) of this section.

(b) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may request approval from the Administrator to meet an ambient concentration limit on beryllium in the vicinity of the stationary source of 0.01 $\mu g/m^3$, averaged over a 30-day period.

(1) Approval of such requests may be granted by the Administrator provided that:

(i) At least 3 years of data is available which in the judgment of the Administrator demonstrates that the future ambient concentrations of beryllium in the vicinity of the stationary source will not exceed 0.01 $\mu g/m^3$, averaged over a 30-day period. Such 3-year period shall be the 3 years ending 30 days before the effective date of this standard.

(ii) The owner or operator requests such approval in writing within 30 days after the effective date of this standard.

(iii) The owner or operator submits a report to the Administrator within 45 days after the effective date of this standard which report includes the following information:

(a) Description of sampling method including the method and frequency of calibration.

(b) Method of sample analysis.

(c) Averaging technique for determining 30-day average concentrations.

(d) Number, identity, and location (address, coordinates, or distance and heading from plant) of sampling sites.

(e) Ground elevations and height above ground of sampling inlets.

(f) Plant and sampling area plots showing emission points and sampling sites. Topographic features significantly affecting dispersion including plant building heights and locations shall be included.

(g) Information necessary for estimating dispersion including stack height, inside diameter, exit gas temperature, exit velocity or flow rate, and beryllium concentration.

(h) A description of data and procedures (methods or models) used to design the air sampling network (i.e., number and location of sampling sites).

(f) Air sampling data indicating beryllium concentrations in the vicinity of the stationary source for the 3-year period specified in paragraph (b)(1) of this section. This data shall be presented chronologically and include the beryllium concentration and location of each individual sample taken by the network and the corresponding 30-day average beryllium concentrations.

(2) Within 60 days after receiving such report, the Administrator will notify the owner or operator in writing whether approval is granted or denied. Prior to denying approval to comply with the provisions of paragraph (b) of this section, the Administrator will consult with representatives of the stationary source for which the demonstration report was submitted.

(c) The burning of beryllium and/or beryllium-containing waste, except propellants, is prohibited except in incinerators, emissions from which must comply with the standard.

§ 61.33 Stack sampling.

(a) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator required to comply with § 61.32(a) shall test emissions from his source,

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to an emission test so that he may at his option observe the test.

(c) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in any 24-hour period. Where emissions depend upon the relative frequency of operation of different types of processes, operating hours, operating capacities, or other factors, the calculation of maximum 24-hour-period emissions will be based on that combination of factors which is likely to occur during the subject period and which result in the maximum emissions. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until a new emission level has been estimated by calculation and the results reported to the Administrator.

(d) All samples shall be analyzed and beryllium emissions shall be determined within 30 days after the source test. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(e) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.34 Air sampling.

(a) Stationary sources subject to § 61.32(b) shall locate air sampling sites in accordance with a plan approved by the Administrator. Such sites shall be located in such a manner as is calculated to detect maximum concentrations of beryllium in the ambient air.

(b) All monitoring sites shall be operated continuously except for a reasonable time allowance for instrument maintenance and calibration, for changing filters, or for replacemet of equipment needing major repair.

(c) Filters shall be analyzed and concentrations calculated within 30 days after filters are collected. Records of concentrations at all sampling sites and other data needed to determine such concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) Concentrations measured at all sampling sites shall be reported to the Administrator every 30 days by a registered letter.

(e) The Administrator may at any time require changes in, or expansion of, the sampling network.

Subpart D—National Emission Standard for Beryllium Rocket Motor Firing

§ 61.40 Applicability.

The provisions of this subpart are applicable to rocket motor test sites.

§ 61.41 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Rocket motor test site" means any building, structure, facility, or installation where the static test firing of a beryllium rocket motor and/or the disposal of beryllium propellant is conducted.

(b) "Beryllium propellant" means any propellant incorporating beryllium.

§ 61.42 Emission standard.

(a) Emissions to the atmosphere from rocket-motor test sites shall not cause time-weighted atmospheric concentrations of beryllium to exceed 75 microgram minutes per cubic meter of air within the limits of 10 to 60 minutes, accumulated during any 2 consecutive weeks, in any area in which an effect adverse to public health could occur.

(b) If combustion products from the firing of beryllium propellant are collected in a closed tank, emissions from such tank shall not exceed 2 grams per hour and a maximum of 10 grams per day.

§ 61.43 Emission testing—rocket firing or propellant disposal.

(a) Ambient air concentrations shall be measured during and after firing of a rocket motor or propellant disposal and in such a manner that the effect of these emissions can be compared with the standard. Such sampling techniques shall be approved by the Administrator.

(b) All samples shall be analyzed and results shall be calculated within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All results shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following determination of such results.

(c) Records of air sampling test results and other data needed to determine integrated intermittent concentrations shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an air sampling test, so that he may at his option observe the test.

§ 61.44 Stack sampling.

(a) Sources subject to § 61.42(b) shall be continuously sampled, during release of combustion products from the tank, in such a manner that compliance with the standards can be determined. The provisions of § 61.14 shall apply.

(b) All samples shall be analyzed, and beryllium emissions shall be determined within 30 days after samples are taken and before any subsequent rocket motor firing or propellant disposal at the given site. All determinations shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determinations.

(c) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(d) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

Subpart E—National Emission Standard for Mercury

§ 61.50 Applicability.

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, and to those which use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide.

§ 61.51 Definitions.

Terms used in this subpart are defined in the act, in subpart A of this part, or in this section as follows:

(a) "Mercury" means the element mercury, excluding any associated elements, and includes mercury in particulates, vapors, aerosols, and compounds.

(b) "Mercury ore" means a mineral mined specifically for its mercury content.

(c) "Mercury ore processing facility" means a facility processing mercury ore to obtain mercury.

(d) "Condenser stack gases" mean the gaseous effluent evolved from the stack of processes utilizing heat to extract mercury metal from mercury ore.

(e) "Mercury chlor-alkali cell" means a device which is basically composed of an electrolyzer section and a denuder (decomposer) section and utilizes mercury to produce chlorine gas, hydrogen gas, and alkali metal hydroxide.

(f) "Mercury chlor-alkali electrolyzer" means an electrolytic device which is part of a mercury chlor-alkali cell and utilizes a flowing mercury cathode to produce chlorine gas and alkali metal amalgam.

(g) "Denuder" means a horizontal or vertical container which is part of a mercury chlor-alkali cell and in which water and alkali metal amalgam are converted to alkali metal hydroxide, mercury, and hydrogen gas in a short-circuited, electrolytic reaction.

(h) "Hydrogen gas stream" means a hydrogen stream formed in the chlor-alkali cell denuder.

(i) "End box" means a container(s) located on one or both ends of a mercury chlor-alkali electrolyzer which serves as a connection between the electrolyzer and denuder for rich and stripped amalgam.

(j) "End box ventilation system" means a ventilation system which collects mercury emissions from the end-boxes, the mercury pump sumps, and their water colection systems.

(k) "Cell room" means a structure(s) housing one or more mercury electrolytic chlor-alkali cells.

§ 61.52 Emission standard.

Emissions to the atmosphere from stationary sources subject to the provisions of this subpart shall not exceed 2,300 grams of mercury per 24-hour period.

§ 61.53 Stack sampling.

(a) Mercury ore processing facility.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator processing mercury ore shall test emissions from his source.

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the source test. Each determination will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(b) Mercury chlor-alkali plant—hydrogen and end-box ventilation gas streams.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator employing mercury chlor-alkali cell(s) shall test emissions from his source.

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(2) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(3) Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which will occur in a 24-hour period. No changes in the operation shall be made, which would potentially increase emissions above that determined by the most recent source test, until the new emission has been estimated by calculation and the results reported to the Administrator.

(4) All samples shall be analyzed and mercury emissions shall be determined within 30 days after the source test. All the determinations will be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(5) Records of emission test results and other data needed to determine total emissions shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

(c) Mercury chlor-alkali plants—cell room ventilation system.

(1) Stationary sources using mercury chlor-alkali cells may test cell room emissions in accordance with paragraph (c)(2) of this section or demonstrate compliance with paragraph (c)(4) of this section and assume ventilation emissions of 1,300 gms/day of mercury.

(2) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator shall pass all cell room air in forced gas streams through stacks suitable for testing.

(i) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(ii) Within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) An owner or operator may carry out approved design, maintenance, and housekeeping practices. A list of approved design, maintenance, and housekeeping practices may be obtained from the Administrator.

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

I. SOURCE REPORT

EPA USE ONLY

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[illegible] 80

Instructions: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate Environmental Protection Agency Regional Office before (date which is 90 days after the standards are promulgated). A listing of regional offices is provided in § 61.04.

A. SOURCE INFORMATION.

1. Identification/Location - Indicate the name and address of each source.

[illegible] ____________________ [illegible]
COMPANY NAME

[illegible] ______ | ______________ [illegible]
NUMBER STREET ADDRESS

[illegible] ______________ [illegible] ____ [illegible] ______ [illegible]
CITY STATE ZIP CODE

____
COUNTY

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

[illegible] ____________________ [illegible]
NAME

[illegible] ______________ [illegible]
TELEPHONE

2

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant", or "Machine Shop").

[illegible] [illegible]

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

[illegible] [illegible]
NUMBER STREET ADDRESS

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
CITY STATE ZIP CODE

5. Compliance Status - The emissions from this source can ___ cannot meet the emission limitations contained in the National Emission Standards on or before (date which is 90 days after the promulgation of the standards).

Signature of owner, operator or other responsible official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement actions unless granted a waiver of compliance by the Administrator of the Environmental Protection Agency. The information needed for such waivers is listed in Section III of this form.

* * *

FOR EPA USE ONLY [illegible] [illegible] [illegible] [illegible]

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant.

3

1. Process Description - Provide a brief description of each process (e.g., "hydrogen end box" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

[illegible] [illegible]

2. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AB" for asbestos, "BE" for beryllium, or "HG" for mercury.

[illegible] [illegible]

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in Item 2 which enters the process in pounds per month (based on the previous twelve months of operation).

[illegible] [illegible]

4. Control Devices

a. Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.

[illegible] [illegible] [illegible] [illegible]
PRIMARY CONTROL DEVICE TYPE PERCENT REMOVAL EFFICIENCY

[illegible] [illegible] [illegible] [illegible]
SECONDARY CONTROL DEVICE TYPE PERCENT REMOVAL EFFICIENCY

b. Asbestos Emission Control Devices Only

1. If a baghouse is specified in Item 4a, give the following information:

The air flow permeability in cubic feet per minute per square foot of fabric area:

Air flow permeability = ____________ cfm/ft²

- The pressure drop in inches water gauge across the filter at which the baghouse is operated

Operating pressure drop = ____________ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is spun ☐ or not spun ☐.

If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

Thickness = ________ inches   Density = __________ oz/yd^2

11. If a wet collection device is specified in item 4a, give the designed unit contacting energy in inches water gauge.

Unit contacting energy = ________ inches w.g.

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II. WAIVER REQUESTS

EPA USE ONLY
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A. **WAIVER OF COMPLIANCE.** Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants by (date which is 90 days after the standards are promulgated) may request a waiver of compliance from the Administrator of the Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the hazardous pollutant standards if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

The reporting information provided in Section I must accompany this application. Applications should be sent to the appropriate EPA regional office.

1. Processes Involved - Indicate the process or processes emitting hazardous pollutants to which emission controls are to be applied.

____

____

2. Controls

a. Describe the proposed type of control device to be added or modification to be made to the process to reduce the emissions of hazardous pollutants to an acceptable level. Use additional sheets if necessary.

____

____

____

b. Describe the measures that will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment. Use additional sheets if necessary.

____

____

____

3. Increments of Progress - specify the dates by which the following increments of progress will be met.

Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of the component parts to accomplish emission control or process modification.

L54 ... L59
MONTH DAY YEAR 01

Date of initiation of on-site construction or installation of emission control equipment or process change.

L54 ... L59
MONTH DAY YEAR 02

Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

L54 MONTH ˽ DAY ˽ YEAR L59 03

Date by which final compliance is to be achieved.

L54 MONTH ˽ DAY ˽ YEAR L59 04

Signature of owner or operator

- -

B. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the reporting information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source is within the prescribed limits, documentation of this condition must be attached.

Date

Signature of the owner or operator

APPENDIX B—TEST METHODS

METHOD 101. REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (AIR STREAMS)

1. *Principle and applicability*—1.1 *Principle.* Particulate and gaseous mercury emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric form) is reduced to elemental mercury in basic solution by hdroxylamine sulfate. Mercury is aerated from the solution and analyzed using spectrophotometry.

1.2 *Applicability.* This method is applicable for the determination of particulate and gaseous mercury emissions when the carrier gas stream is principally air. The method is for use in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.* A schematic of the sampling train used by EPA is shown in figure 101-1. Commercial models of this train are available, although construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

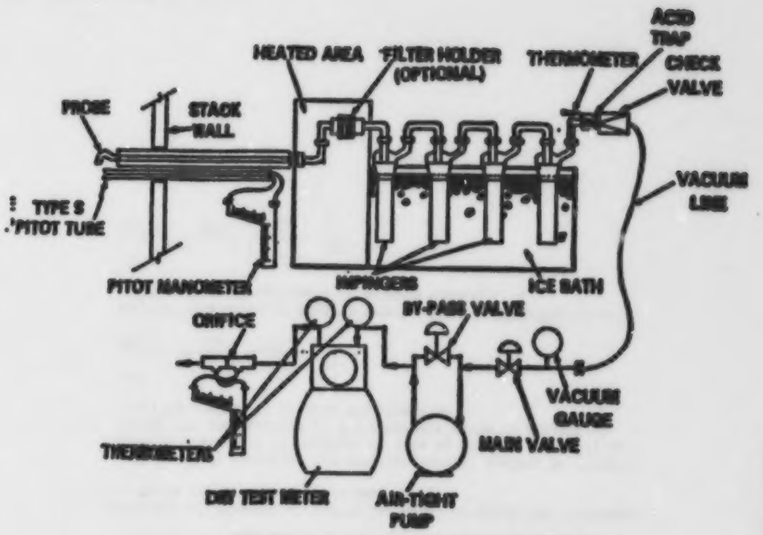

Figure 101-1. Mercury sampling train

2.1.1 *Nozzle.* Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.* Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature of 250° F at the probe outlet during sampling may be used to prevent condensation from occurring.

2.1.3 *Pitot tube.* Type S (Figure 101-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers.* Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid Trap.* Mine Safety Appliances Air Line Filter, Catalogue Number 81857, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system.* Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

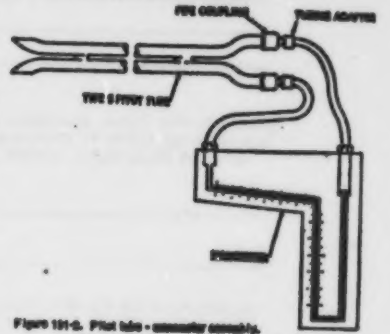

Figure 101-2. Pitot tube - manometer assembly.

2.1.7 *Filter Holder* (*optional*)-*Pyrex glass.* A filter may be used in cases where the gas stream to be sampled contains large quantities of particulate matter. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature of 250° F. should be used to prevent condensation from occurring.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.1.8 *Barometer*. To measure atmospheric pressure to ±0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube*. Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge*. Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value. Micromanometers should be used if warranted.

2.2.3 *Temperature gauge*. Any temperature measuring device to measure stack temperature to within 1° F.

2.2.4 *Pressure gauge*. Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination*. Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Leakless glass sample bottles*. 500 ml and 100 ml with Teflon lined tops.

2.3.2 *Graduated cylinder*. 250 ml.

2.3.3 *Plastic jar*. Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Spectrophotometer*. To measure absorbance at 253.7 nm. Perkin Elmer Model 303, with a cylindrical gas cell (approximately 1.5 in. O.D. x 7 in.) with quartz glass windows, and hollow cathode source, or equivalent.

2.4.2 *Gas sampling bubbler*. Tudor Scientific Glass Co., Smog Bubbler, Catalogue No. TP-1150, or equivalent.

2.4.3. *Recorder*. To match output of spectrophotometer.

3. *Reagents*—3.1 *Stock reagents*—3.1.1 *Potassium iodide*. Reagent grade.

3.1.2 *Distilled water*—3.1.3 *Potassium iodide solution, 25 percent*. Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 to 1.

3.1.4 *Hydrochloric acid*. Concentrated.

3.1.5. *Potassium iodate*. Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0M*. To 800 ml. of 25% potassium iodide solution (reagent 3.1.3), add 800 ml. of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 g. of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1800 ml. with distilled water. The solution should be kept in amber bottles to prevent degradation.

3.1.7 *Sodium hydroxide pellets*. Reagent grade.

3.1.8 *Nitric acid*. Concentrated.

3.1.9 *Hydroxylamine sulfate*. Reagent grade.

3.1.10 *Sodium chloride*. Reagent grade.

3.1.11 *Mercuric chloride*. Reagent grade.

3.2 *Sampling*—3.2.1 *Absorbing solution, 0.1M ICl*. Dilute 100 ml. of the 1.0M ICl stock solution (reagent 3.1.6) to 1 to 1 with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 3 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid*. 1:1 V/V nitric acid—water.

3.2.3 *Distilled, deionized water*.

3.2.4 *Silica gel*. Indicating type, 6 to 16 mesh dried at 350° F. for 2 hours.

3.2.5 *Filter (optional)*. Glass fiber, Mine Safety Appliances 1106BH, or equivalent. A filter may be necessary in cases where the gas stream to be sampled contains large quantities of particulate matter.

3.3 *Analysis*—3.3.1 *Sodium hydroxide, 10 N.*—Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 to 1.

3.3.2 *Reducing agent, 12 percent hydroxylamine sulfate, 12 percent sodium chloride.*—To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 20 analyses and must be prepared daily.

3.3.3. *Aeration gas.*—Zero grade air.

3.3.4 *Hydrochloric acid, 0.3N.*—Dilute 26.5 ml of concentrated hydrochloric acid to 1 to 1 with distilled water.

3.4 *Standard mercury solutions*—3.4.1 *Stock solution.*—Add 0.1354 g of mercuric chloride to 80 ml of 0.3N hydrochloric acid. After the mercuric chloride has dissolved, add 0.3N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard solutions.*—Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.3N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Soutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 3 months; however, periodic checks should be performed to insure quality.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to ensure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points:

4.2.1 Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion, or contraction. For a rectangular cross section, determine an equivalent diameter from the following equation:

$$D_e=\frac{2LW}{L+W} \qquad \text{eq. 101-1}$$

where:

D_e=Equivalent diameter.
L=Length.
W=Width.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 101-3 to determine the minimum number of traverse points. However, use figure 101-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 101-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 101-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.2.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross sectional layout and location of traverse points:

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 101-4 and table 101-1. The traverse axes shall divide the stack cross section into equal parts.

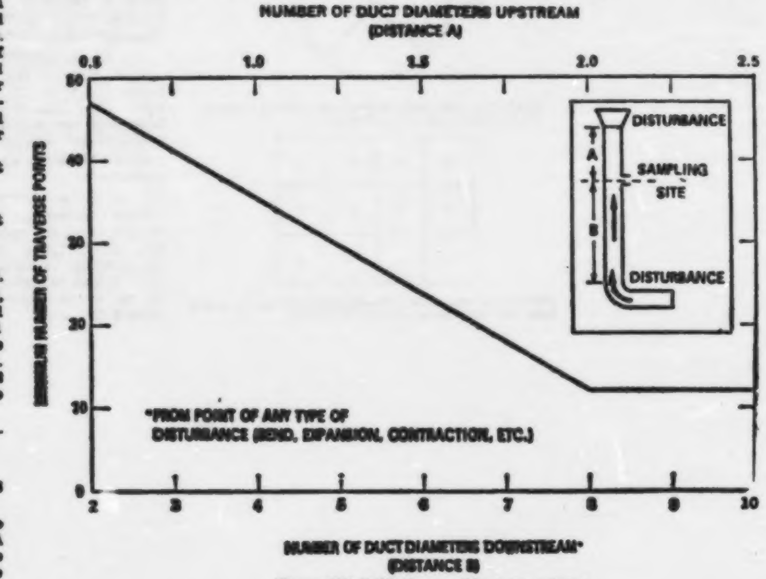

Figure 102-3. Minimum of traverse points.

Table 101-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

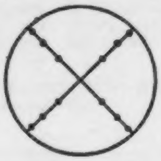

Figure 101-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

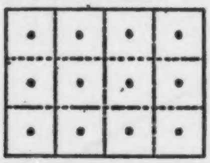

Figure 101-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to figure 101-5.

4.4 Measurement of stack conditions:

4.4.1 Set up the apparatus as shown in figure 101-2. Make sure all connections are tight and leak-free. Measure the velocity head and temperature at the traverse points specified by section 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 Preparation of sampling train:

4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M IC1, tap water, and finally distilled water. Place 100 ml of 0.1M IC1 in each of the first three impingers, and place approximately 200 g of preweighed silica gel in the fourth impinger. Save 80 ml of the 0.1M IC1 as a blank in the sample analysis. Set up the train and the probe as in figure 101–1.

4.5.2 If the gas stream to be sampled is excessively dirty or moist, the first impinger may clog or become dilute too rapidly for sufficient testing. A filter can be placed ahead of the impingers to collect the particulates. An initial empty impinger may also be used to remove excess moisture. If a fifth impinger is required, the final impinger may have to be carefully taped to the outside of the sample box.

4.5.3 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature of at least 250° F. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 Mercury train operation:

4.6.1 For each run, record the data required on the example sheet shown in figure 101–6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 cfm. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high mercury concentrations can prevent sampling in one run for the desired minimum time. This is indicated by reddening in the first impinger as free iodine is liberated. In this case, a run may be divided into two or more subruns to ensure that the absorbing solutions are not depleted.

PLANT__________
LOCATION__________
OPERATOR__________
DATE__________
RUN NO.__________
SAMPLE BOX NO.__________
METER BOX NO.__________
METER $\Delta H_@$__________
C FACTOR__________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE__________
BAROMETRIC PRESSURE__________
ASSUMED MOISTURE, %__________
HEATER BOX SETTING__________
PROBE LENGTH, m.__________
NOZZLE DIAMETER, in.__________
PROBE HEATER SETTING__________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (P_s), in. Hg	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft^3	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

Figure 101-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note the standard nomographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard nomograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 Sample recovery:

4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M ICl solution. Add these rinses to the first sample bottle. For a blank, place 80 ml of the 0.1M ICl in a 100 ml sample bottle. If used, place the filter along with 100 ml of 0.1M ICl in another 100 ml sample bottle. Retain a filter blank. Place the silica gel in the plastic jar. Seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 Analysis:

4.8.1 *Apparatus preparation*.—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 *Analysis preparation*.—Adjust the air delivery pressure and the needle valve to obtain a constant airflow of about 1.3 to/ 1/min. The analysis tube should be bypassed except during aeration. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.8.3. Place the analysis tube in the line, and aerate until a miximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 *Sample preparation*.—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M 1C1 if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately in sample line.

4.8.4 *Mercury determination*.—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. *Calibration*.—5.1 *Sampling train*.—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter, and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis*.—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentrations of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. *Calculations*.—6.1 Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop. See data sheet (fig. 101–6).

6.2 *Dry gas volume*.—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 101–2.

$$V_{m_s}=V_m\frac{T_s}{T_m}\frac{\left(P_{bar}+\frac{\Delta H}{13.6}\right)}{P_s}$$

eq. 101-2

where:

V_{m_s} =Volume of gas sample through the dry gas meter (stack conditions), ft^3.

V_m =Volume of gas sample through the dry gas meter (meter conditions), ft^3.

T_s =Average temperature of stack gas, °R.

T_m =Average dry gas meter temperature, °R.

P_{bar} = Barometric pressure at the orifice meter, inHg.

ΔH = Average pressure drop across the orifice meter, inH_2O.

13.6 = Specific gravity of mercury.

P_s = Stack pressure, P_{bar} ± static pressure, inHg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 101-3}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{in.Hg.-ft}^3}{\text{ml.-°R}}$, when these units are used.

V_{l_c} = Total volume of liquid collected in impingers and silica gel (see figure 101-7), ml.

T_s = Average stack gas temperature, °R.

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

6.4 Total gas volume.

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 101-4}$$

where:

V_{total} = Total volume of gas sample (stack conditions), ft³.

V_{m_s} = Volume of gas through gas meter (stack conditions), ft³.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft³.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		g ml

CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml):

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 101-7. Analytical data.

6.5 Stack gas velocity. Use equation 101-5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta P})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq. 101-5}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft.}}{\text{sec.}} \left(\frac{\text{lb.-in.Hg}}{\text{lb.mole-°R-in.H}_2\text{O}}\right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg.}$ = Average square root of the velocity head of stack gas (in. H_2O)$^{1/2}$ (see fig. 101-8).

P_s = Stack pressure, P_{bar} ± static pressure, in. Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb./lb. mole.

Figure 101-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 101-8 to determine the average stack gas velocity from equation 101-5.

6.6 Mercury collected. Calculate the total weight of mercury collected by using equation 101-6.

$$W_t = V_1 C_1 - V_b C_b \ (+ V_f C_f) \ldots \text{eq. 101-6}$$

where:

W_t = total weight of mercury collected, μg.

PLANT________________________

DATE________________________

RUN NO.________________________

STACK DIAMETER, in.________________________

BAROMETRIC PRESSURE, in. Hg.________________________

STATIC PRESSURE IN STACK (P_g), in. Hg.________________________

OPERATORS________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_S), °F
	AVERAGE:		

Figure 101-8. Velocity traverse data.

V_l = Total volume of condensed moisture and ICl in sample bottle, ml.

C_l = Concentration of mercury measured in sample bottle, µg/ml.

V_b = Total volume of ICl used in sampling (impinger contents and all wash amounts), ml.

C_b = Blank concentration of mercury in ICl solution, µg/ml.

V_f = Total volume of ICl used in filter bottle (if used), ml.

C_f = Concentration of mercury in filter bottle (if used), µg/ml.

6.7 Total mercury emission. Calculate the total amount of mercury emitted from each stack per day by equation 101-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total mercury emissions from a source will be the summation of results from all stacks.

$$R=\frac{W_t(v_s)_{avg.}A_s}{V_{total}}\times\frac{86{,}400\ \text{seconds/day}}{10^6\ \mu\text{g/g.}}$$

eq. 101-7

where:

R = Rate of emission, g/day.

W_t = Total weight of mercury collected, µg.

V_{total} = Total volume of gas sample (stack conditions), ft³.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft².

6.8 Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).

$$I=\frac{100V_{total}}{A_n\Theta(v_s)_{avg.}}$$

eq. 101-8

where:

I = Percent of isokinetic sampling.

V_{total} = Total volume of gas sample (stack conditions), ft³.

A_n = Probe tip area, ft².

Θ = Sampling time, sec.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If $90\% \leq I \leq 110\%$, the results are acceptable; otherwise, reject the test and repeat.

8. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

2. Determining Dust Concentration in a Gas Stream, ASME Performance Test Code No. 27, New York, N.Y., 1957.

3. Devorkin, Howard, et al., Air Pollution Source Testing Manual, Air Pollution Control District, Los Angeles, Calif., Nov. 1963.

4. Hatch, W. R. and W. L. Ott, "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Anal. Chem., 40:2085–87, 1968.

5. Mark, L. S., Mechanical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1951.

6. Martin, Robert M., Construction Details of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0581.

7. Methods for Determination of Velocity, Volume, Dust and Mist Content of Gases, Western Precipitation Division of Joy Mfg. Co., Los Angeles, Calif. Bul. WP-50, 1968.

8. Perry, J. H., Chemical Engineers' Handbook, McGraw-Hill Book Co., Inc., New York, N.Y., 1960.

9. Rom, Jerome J., Maintenance, Calibration, and Operation of Isokinetic Source Sampling Equipment, Environmental Protection Agency, APTD-0576.

10. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14–19, 1970.

11. Smith, W. S., et al., Stack Gas Sampling Improved and Simplified with New Equipment, APCA paper No. 67-119, 1967.

12. Smith, W. S., R. T. Shigehara, and W. F. Todd, A Method of Interpreting Stack Sampling Data, Paper presented at the 63d Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14–19, 1970.

13. Specifications for Incinerator Testing at Federal Facilities PHS, NCAPC, 1967.

14. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM Standards, part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

15. Vennard, J. K., Elementary Fluid Mechanics, John Wiley and Sons, Inc., New York, 1947.

METHOD 102. REFERENCE METHOD FOR DETERMINATION OF PARTICULATE AND GASEOUS MERCURY EMISSIONS FROM STATIONARY SOURCES (HYDROGEN STREAMS)

1. *Principle and applicability*—1.1 *Principle.*—Particulate and gaseous mercury emissions are isokinetically sampled from the source and collected in acidic iodine monochloride solution. The mercury collected (in the mercuric form) is reduced to elemental mercury in basic solution by hydroxylamine sulfate. Mercury is aerated from the solution and analyzed using spectrophotometry.

1.2 *Applicability.*—This method is applicable for the determination of particulate and gaseous mercury emissions when the carrier gas stream is principally hydrogen. The method is for use in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the sampling train used by EPA is shown in figure 102-1. Commercial models of this train are available, although complete construction details are described in APTD-0581,[1] and operating and maintenance procedures are described in APTD-0576. The components essential to this sampling train are the following:

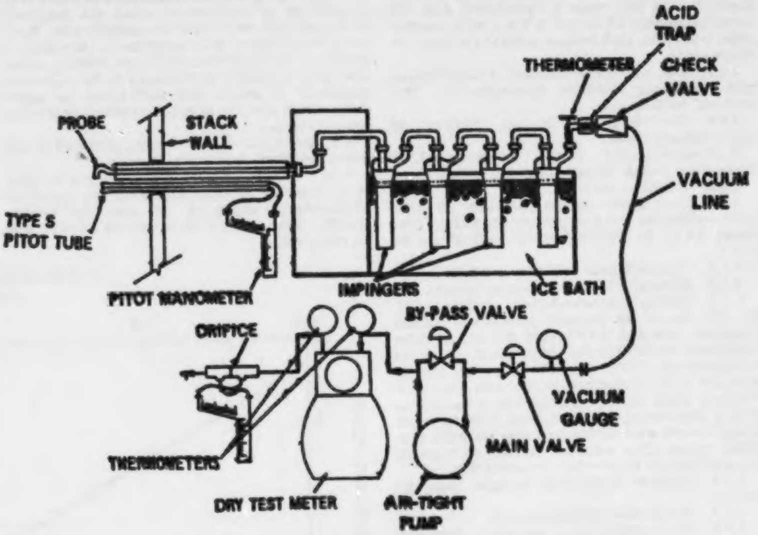

Figure 102-1. Mercury sampling train

2.1.1 *Nozzle.* Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.* Sheathed Pyrex[2] glass.

2.1.3 *Pitot tube.* Type S (figure 102-2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Impingers.* Four Greenburg-Smith impingers connected in series with glass ball-joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with one-half inch ID glass tube extending to one-half inch from the bottom of the flask.

2.1.5 *Acid trap.* Mine safety appliances air line filter, catalogue No. 81857, with acid absorbing cartridge and suitable connections, or equivalent.

2.1.6 *Metering system.* Vacuum gage, leakless pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD-0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer.* To measure atmospheric pressure to ± 0.1 in hg.

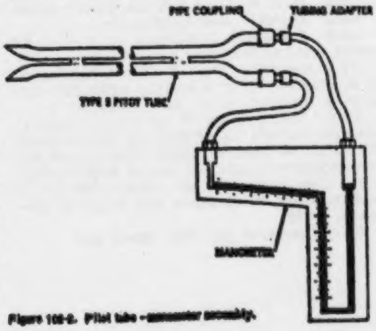

Figure 102-2. Pitot tube - manometer assembly.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names or commercial products does not constitute endorsement by the Environmental Protection Agency.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture, and velocity)*—2.2.1 *Pitot tube*. Type S, or equivalent, with a coefficient within 5 percent over theworking range.

2.2.2 *Differential pressure gage*. Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value. Micromanometers should be used if warranted.

2.2.3 *Temperature gage*. Any temperature-measuring device to measure stack temperature to within 1° F.

2.2.4 *Pressure gage*. Pitot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in hg.

2.2.5 *Moisture determination*. Drying tubes, condensers, or equivalent, to determine stack gas moisture content in hydrogen to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Leakless glass sample bottles*. 500 ml and 200 ml with Teflon-lined tops.

2.3.2 *Graduated cylinder*. 250 ml.

2.3.3 *Plastic jar*. Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Spectrophotometer*. To measure absorbance at 253.7 nm. Perkin Elmer model 303, with a cylindrical gas cell (approximately 1.5 in o.d. x 7 in) with quartz glass windows, and hollow cathode source, or equivalent.

2.4.2 *Gas sampling bubbler*. Tudor Scientific Co. Smog Bubbler, catalogue No. TP-1150, or equivalent.

2.4.3 *Recorder*. To match output of spectrophotometer.

3. *Reagents*.—3.1 Stock reagents.—3.1.1 Potassium iodide. Reagent grade.

3.1.2 *Distilled water*.

3.1.3 *Potassium iodide solution, 25 percent*.—Dissolve 250 g of potassium iodide (reagent 3.1.1) in distilled water and dilute to 1 to 1.

3.1.4 *Hydrochloric acid*. Concentrated.

3.1.5 *Potassium iodate*. Reagent grade.

3.1.6 *Iodine monochloride (ICl) 1.0M*. To 800 ml of 25 percent potassium iodide solution (reagent 3.1.3), add 800 ml of concentrated hydrochloric acid. Cool to room temperature. With vigorous stirring, slowly add 135 g of potassium iodate and continue stirring until all free iodine has dissolved to give a clear orange-red solution. Cool to room temperature and dilute to 1,800 ml with distilled water. The solution should be kept in amber bottles to prevent degradation.

3.1.7 *Sodium hydroxide pellets*. Reagent grade.

3.1.8 *Nitric acid*. Concentrated.

3.1.9 *Hydroxylamine sulfate*. Reagent grade.

3.1.10 *Sodium chloride*. Reagent grade.

3.1.11 *Mercuric chloride*. Reagent grade.

3.2 *Sampling*. 3.2.1 *Absorbing solution, 0.1M ICl*. Dilute 100 ml of the 1.0M ICl stock solution (reagent 3.1.6) to 1 l with distilled water. The solution should be kept in glass bottles to prevent degradation. This reagent should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

3.2.2 *Wash acid*. 1:1 V/V nitric acid-water.

3.2.3 *Distilled, deionized water*.

3.2.4 *Silica gel*. Indicating type, 6 to 16 mesh, dried at 350°F for 2 hours.

3.3. *Analysis*—3.3.1 *Sodium hydroxide, 10N*. Dissolve 400 g of sodium hydroxide pellets in distilled water and dilute to 1 l.

3.3.2 *Reducing agent, 12 percent hydroxylamine sulfate, 12 percent sodium chloride*. To 60 ml of distilled water, add 12 g of hydroxylamine sulfate and 12 g of sodium chloride. Dilute to 100 ml. This quantity is sufficient for 30 analyses and must be prepared daily.

3.3.3 *Aeration gas*. Zero grade air.

3.3.4 *Hydrochloric acid, 0.3N*. Dilute 25.5 ml of concentrated hydrochloric acid to 1 l with distilled water.

3.4 *Standard mercury solutions*—3.4.1 *Stock solution*. Add 0.1354 g of mercuric chloride to 80 ml of 0.3N hydrochloric acid. After the mercuric chloride has dissolved, add 0.3N hydrochloric acid and adjust the volume to 100 ml. One ml of this solution is equivalent to 1 mg of free mercury.

3.4.2 *Standard solutions*. Prepare calibration solutions by serially diluting the stock solution (3.4.1) with 0.3N hydrochloric acid. Prepare solutions at concentrations in the linear working range for the instrument to be used. Solutions of 0.2 μg/ml, 0.4 μg/ml and 0.6 μg/ml have been found acceptable for most instruments. Store all solutions in glass-stoppered, glass bottles. These solutions should be stable for at least 2 months; however, periodic checks should be performed to insure quality.

4. *Procedure*. 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since mercury is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of mercury to be collected generally is small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as is practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross section, determine an equivalent diameter from the following equation:

$$D_e=\frac{2LW}{L+W} \qquad \text{eq. 102-1}$$

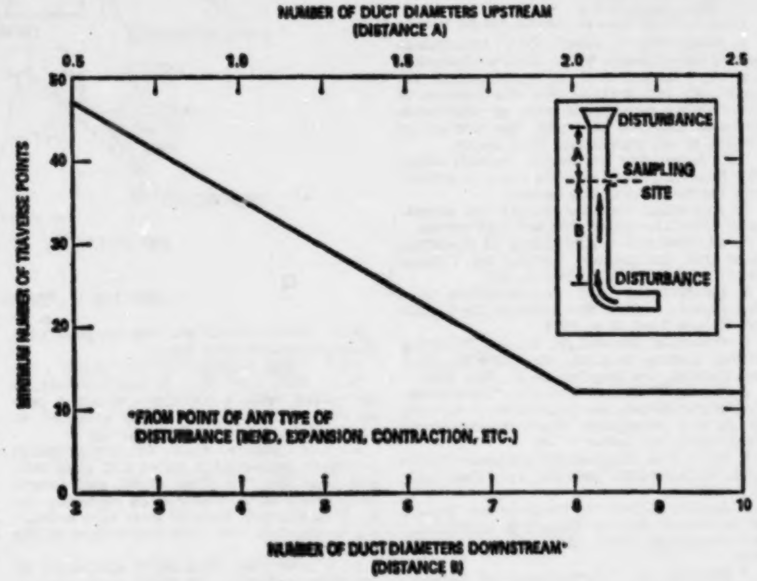
where:

D_e=equivalent diameter.
L=length.
W=width.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 102-3 to determine the minimum number of traverse points. However, use figure 102-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 102-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 102-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.3.2.



*FROM POINT OF ANY TYPE OF DISTURBANCE (BEND, EXPANSION, CONTRACTION, ETC.)

Figure 104-3. Minimum number of traverse points.

4.2.6 If a selected sampling point is closer than 1 inch from stack wall, adjust the location of that point to insure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 102-4 and table 102-1. The traverse axes shall divide the stack-cross section into equal parts.

4.3.2 For rectangular stacks divide the cross-section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between one and two. Locate the traverse points at the centroid of each equal area according to figure 102-5.

4.4 Measurement of stack conditions.

4.4.1 Set up the apparatus as shown in figure 102-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by section 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

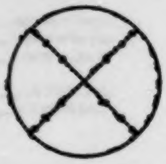


Figure 102-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

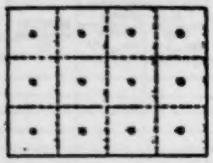


Figure 102-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. Sound engineering judgment should be used.

4.5 Preparation of sampling train.

4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by rinsing with wash acid, tap water, 0.1M ICl, tap water, and finally distilled water. Place 100 ml of 0.1M ICl in each of the first three impingers, and place approximately 200 g. of preweighed silica gel in the fourth impinger. Save 80 ml of the 0.1M ICl as a blank in the sample analysis. Set up the train and the probe as in Figure 102-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. Place crushed ice around the impingers. Add more ice during the run to keep the temperature of the gases leaving the last impinger at 70° F or less.

4.6 Mercury train operation.

4.6.1 Safety procedures. It is imperative that the sampler conduct the source test under conditions of utmost safety, since hydrogen and air mixtures are explosive. The sample train essentially is leakless, so that attention to safe operation can be concentrated at the inlet and outlet. The following specific items are recommended:

4.6.1.1 Operate only the vacuum pump during the test. The other electrical equipment, e.g. heaters, fans and timers, normally are not essential to the success of a hydrogen stream test.

4.6.1.2 Seal the sample port to minimize leakage of hydrogen from the stack.

4.6.1.3 Vent sampled hydrogen at least 10 feet away from the train. This can be accomplished easily by attaching a ½-in i.d. Tygon tube to the exhaust from the orifice meter.

4.6.2 For each run, record the data required on the sample sheet shown in figure 102-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.3 Sample at a rate of 0.5 to 1.0 cfm. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high mercury concentrations can prevent sampling in one run for the desired minimum time. This is indicated by reddening in the first impinger as free iodine is liberated. In this case, a run may be divided into two or more subruns to insure that the absorbing solutions are not depleted.

Table 102-1. Location of traverse points in circular stacks
(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

PLANT__________
LOCATION__________
OPERATOR__________
DATE__________
RUN NO.__________
SAMPLE BOX NO.__________
METER BOX NO.__________
METER $\Delta H_@$__________
C FACTOR__________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE__________
BAROMETRIC PRESSURE__________
ASSUMED MOISTURE, %__________

PROBE LENGTH, m.__________
NOZZLE DIAMETER, in.__________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	STATIC PRESSURE (P_s), in. Hg.	STACK TEMPERATURE (T_s), °F	VELOCITY HEAD (ΔP_s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH), in. H_2O	GAS SAMPLE VOLUME (V_m), ft³	GAS SAMPLE TEMPERATURE AT DRY GAS METER		SAMPLE BOX TEMPERATURE, °F	IMPINGER TEMPERATURE, °F
							INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

Figure 102-6. Field data

4.6.4 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period, using the following procedures.

4.6.4.1 Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. The available nomographs, however, are set up for use in air streams, and minor changes are required to provide applicability to hydrogen.

4.6.4.2 Calibrate the meter box orifice. Use the techniques as described in APTD-0576.

4.6.4.3 The correction factor nomograph discussed in APTD-0576 and shown on the reverse side of commercial nomographs will not be used. In its place, the correction factor will be calculated using equation 102-2.

$$C=0.01\frac{(C_pM_d)^2}{\Delta H_@}\frac{P_s}{P_m}\frac{T_m}{M_s}$$

eq. 102-2

where:

C=Correction factor.
C_p=Pitot tube coefficient.
M_d=Mole fraction dry gas.
P_s=Stack pressure, inHg.
P_m=Meter pressure, inHg.
T_m=Meter temperature, °R.
M_s=Molecular weight of stack gas (from 4.4.4), lb/lb mole.
$\Delta H_@$=Meter box calibration factor, obtained in step 4.6.4.2.

4.6.4.4 Set the calculated correction factor on the front of the operating nomograph. Select the proper nozzle and set the K-factor on the nomograph as detailed in APTD-0576.

4.6.4.5 Read the velocity head in the stack at each sample point from the manometer in the meter box. Convert the hydrogen ΔP to an equivalent value for air by multiplying by a ratio of the molecular weight of air to hydrogen at the stack moisture content. Insert this value of ΔP onto the nomograph and read off ΔH. Again, convert the ΔH, which is an air equivalent value, to the ΔH for hydrogen by dividing by 13. This factor includes the ratio of the dry molecular weights and a correction for the different orifice calibration factors for hydrogen and air. This procedure is diagrammed below:

Observe ΔP→Multiply by $\left(\frac{MW\text{ air}}{MWH_2}\right)$→Set this on nomograph.

Read off ΔH→Divide by 13=*WH* to be used on meter box.

4.6.4.6 Operate the sample train at the calculated ΔH at each sample point.

4.6.5 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in section 4.7.

4.7 Sample recovery.

4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in section 4.5.1). This operation should be performed in an area free of possible mercury contamination. Industrial laboratories and ambient air around mercury-using facilities are not normally free of mercury contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Place the contents (measured to ±1 ml) of the first three impingers into a 500 ml sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with two 50 ml portions of 0.1M ICl solution. Add these rinses to the first bottle. For a blank, place 50 ml of the 0.1M ICl in a 100 ml sample bottle. Place the silica gel in the plastic jar. Seal and secure all containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8 *Analysis*—4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 253.7 nm.

4.8.2 *Analysis preparation.*—Adjust the air delivery pressure and the needle valve to obtain a constant air flow of about 1.3 l/min. The analysis tube should be bypassed except during aeration. Purge the equipment for 2 minutes. Prepare a sample of mercury standard solution (3.4.2) according to section 4.8.3. Place the analysis tube in the line, and aerate until a maximum peak height is reached on the recorder. Remove the analysis tube, flush the lines, and rinse the analysis tube with distilled water. Repeat with another sample of the same standard solution. This purge and analysis cycle is to be repeated until peak heights are reproducible.

4.8.3 *Sample preparation.*—Just prior to analysis, transfer a sample aliquot of up to 50 ml to the cleaned 100 ml analysis tube. Adjust the volume to 50 ml with 0.1M ICl if required. Add 5 ml of 10 N sodium hydroxide, cap tube with a clean glass stopper and shake vigorously. Prolonged, vigorous shaking at this point is necessary to obtain an accurate analysis. Add 5 ml of the reducing agent (reagent 3.3.2), cap tube with a clean glass stopper and shake vigorously and immediately place in sample line.

4.8.4 *Mercury determination.*—After the system has been stabilized, prepare samples from the sample bottle according to section 4.8.3. Aerate the sample until a maximum peak height is reached on the recorder. The mercury content is determined by comparing the peak heights of the samples to the peak heights of the calibration solutions. If collected samples are out of the linear range, the samples should be diluted. Prepare a blank from the 100 ml bottle according to section 4.8.3 and analyze to determine the reagent blank mercury level.

5. *Calibration.*—5.1 *Sampling Train.* 5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube and dry gas meter. Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Prepare a calibration curve for the spectrophotometer using the standard mercury solutions. Plot the peak heights read on the recorder versus the concentration of mercury in the standard solutions. Standards should be interspersed with the samples since the calibration can change slightly with time. A new calibration curve should be prepared for each new set of samples run.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop.*—See data sheet (fig. 102-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 102-3.

$$V_{m_s}=V_m\frac{T_s}{T_m}\frac{\left(P_{bar}+\frac{\Delta H}{13.6}\right)}{P_s}$$

eq. 102-3

where:

V_{m_s}=Volume of gas sample through the dry gas meter (stack conditions), ft.³
V_m=Volume of gas sample through the dry gas meter (meter conditions), ft³.
T_s=Average temperature of stack gas, °R.
T_m=Average dry gas meter temperature, °R.
P_{bar}=Barometric pressure at the orifice meter, inHg.
ΔH=Average pressure drop across the orifice meter, inH_2O.
13.6=Specific gravity of mercury.
P_s=Stack pressure, P_{bar} ± static pressure, inHg.

6.3 *Volume of water vapor.*

$$V_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 102-4}$$

where:

V_{w_s} = Volume of water vapor in the gas sample (stack conditions), ft^3.

$K_w = 0.00267 \frac{\text{in. Hg.} - \text{ft}^3}{\text{ml.} - {}^\circ\text{R}}$, when these units are used.

V_{l_c} Total volume of liquid collected in impingers and silica gel (see figure 102-7), ml.

T_s Average stack gas temperature, °R.

P_s Stack pressure, $P_{bar} \pm$ static pressure, in. Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 102-5}$$

where:

V_{total} = total volume of gas sample (stack conditions), ft^3.

V_{m_s} = Volume of gas through dry gas meter (stack conditions), ft^3.

V_{w_s} = Volume of water vapor in gas sample (stack conditions), ft^3.

	VOLUME OF LIQUID WATER COLLECTED		
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g	
FINAL			
INITIAL			
LIQUID COLLECTED			
TOTAL VOLUME COLLECTED		g*	ml

CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml).

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 102-7. Analytical data.

6.5 *Stack gas velocity*—Use equation 102-6 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta P})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq 102-6}$$

where:

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

$K_p = 85.53 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole}^\circ\text{-R-inH}_2\text{O}} \right)^{1/2}$, when these units are used.

C_p = Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$ = Average stack gas temperature, °R.

$(\sqrt{\Delta P})_{avg.}$ = Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 102-8).

P_s = Stack pressure, $P_{bar} \pm$ static pressure, in Hg.

M_s = Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

Figure 102-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 102-8 to determine the average stack gas velocity from equation 102-6.

6.6 Mercury collected. Calculate the total weight of mercury collected by using eq. 102-7.

PLANT________________________

DATE________________________

RUN NO.________________________

STACK DIAMETER, in.________________

BAROMETRIC PRESSURE, in. Hg.____________

STATIC PRESSURE IN STACK (P_g), in. Hg.________

OPERATORS________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_S), °F
	AVERAGE:		

Figure 102-8. Velocity traverse data.

$$W_t = V_1C_1 - V_2C_2 \text{......eq. 102-7}$$

where:

W_t = Total weight of mercury collected, μg.
V_1 = Total volume of condensed moisture and ICl in sample bottle, ml.
C_1 = Concentration of mercury measured in sample bottle, μg/ml.
V_2 = Total volume of ICl used in sampling (impinger contents and all wash amounts), ml.
C_2 = Blank concentration of mercury in ICl solution, μg/ml.

6.7 *Total mercury emission.*—Calculate the total amount of mercury emitted from each stack per day by equation 102-8. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total mercury emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg.} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \text{ μg/g}} \qquad \text{eq. 102-8}$$

where:

R = Rate of emission, g/day.
W_t = Total weight of mercury collected, μg.
V_{total} = Total volume of gas sample (stack conditions), ft³.
$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.
A_s = Stack area, ft².

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I = \frac{100 V_{total}}{A_n \oplus (v_s)_{avg.}} \qquad \text{eq. 102-9}$$

where:

I = Percent of isokinetic sampling.
V_{total} = Total volume of gas sample (stack conditions), ft³.
A_n = Probe tip area, ft².
$\oplus$ = Sampling time, sec.
$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

7. *Evaluation of results.*—7.1 Determination of compliance.—7.1.1 Each performance test shall consist of three repititions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results: If 90% ≤ I ≤ 110%, the results are acceptable; otherwise, reject the test and repeat.

8. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, Dec. 6, 1967.

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10. Shigehara, R. T., W. F. Todd, and W. S. Smith, Significance of Errors in Stack Sampling Measurements, Paper presented at the Annual Meeting of the Air Pollution Control Association, St. Louis, Mo., June 14–19, 1970.

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13. Specifications for Incinerator Testing at Federal Facilities PHS, NCAPC, 1967.

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METHOD 103. BERYLLIUM SCREENING METHOD

1. *Principle and applicability.*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from three points in a duct or stack. The collected sample is analysed for beryllium using an appropriate technique.

1.2 *Applicability.*—This procedure details guidelines and requirements for methods acceptable for use in determining beryllium emissions in ducts or stacks at stationary sources, as specified under the provisions of § 61.14 of the regulations.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the required sampling train configuration is shown in figure 103-1. The essential components of the train are the following:

2.1.1 *Nozzle.*—Stainless steel, or equivalent, with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[1] glass.

2.1.3 *Filter.*—Millipore AA, or equivalent, with appropriate filter holder that provides a positive seal against leakage from outside or around the filter. It is suggested that a Whatman 41, or equivalent, be placed immediately against the back side of the Millipore filter as a guard against breakage of the Millipore. Include the Whatman 41 in the analysis. Equivalent filters must be at least 99.95 percent efficient (DOP Test) and amenable to the analytical procedure.

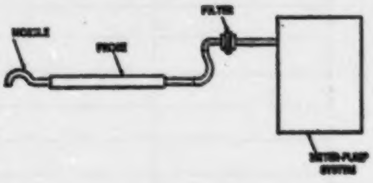

Figure 103-1. Beryllium screening method; sample train schematic.

2.1.4 *Meter-pump system.*—Any system that will maintain isokinetic sampling rate, determine sample volume, and is capable of a sampling rate of greater than 0.5 cfm.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity).*—The following equipment shall be used in the manner specified in section 4.3.1.

2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

2.2.3. *Temperature gauge.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gauge.*—Any device to measure stack pressure to within 0.1 in. Hg.

2.2.5 *Barometer.*—To measure atmospheric pressure to within 0.1 in. Hg.

2.2.6 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery.*—2.3.1 *Probe cleaning equipment.*—Probe brush or cleaning rod at least as long as probe, or equivalent. Clean cotton balls, or equivalent, should be used with the rod.

2.3.2 *Leakless glass sample bottles.*

2.4 *Analysis.*—2.4.1 Equipment necessary to perform an atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent analysis.

3. *Reagents.*—3.1 *Sample recovery.*—3.1.1 *Acetone.*—Reagent grade.

3.1.2 *Wash acid.*—1:1 V/V hydrochloric acid-water.

3.2 *Analysis.*—3.2.1 Reagents as necessary for the selected analytical procedure.

4. *Procedure.*—4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimise exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 *Selection of a sampling site and number of runs.*—4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion or contraction. For rectangular cross-section, determine an equivalent diameter using the following equation:

$$D_e = \frac{2LW}{L+W} \text{-----------------------------} \text{ eq. 103-1}$$

where:

D_e = equivalent diameter
L = length
W = width

4.2.3 Some sampling situations may render the above sampling site criteria impractical. When this is the case, an alternate site may be selected but must be no less than two diameters downstream and one-half diameter upstream from any point of disturbance. Additional sample runs are recommended at any sample site not meeting the criteria of section 4.2.2.

4.2.4 Three runs shall constitute a test. The runs shall be conducted at three different points. The three points shall proportionately divide the diameter, i.e. be located at 25, 50 and 75 percent of the diameter from the inside wall. For horizontal ducts, the diameter shall be in the vertical direction. For rectangular ducts, sample on a line through the centroid and parallel to a side. If additional runs are required per section 4.2.3, proportionately divide the duct to accommodate the total number of runs.

4.3 *Measurement of stack conditions.* 4.3.1 Measure the stack gas pressure, moisture, and temperature, using the equipment described in § 2.2. Determine the molecular weight of the stack gas. Sound engineering estimates may be made in lieu of direct measurements. The basis for such estimates shall be given in the test report.

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[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

4.4 *Preparation of sampling train.*—4.4.1 Assemble the sampling train as shown in figure 103–1. It is recommended that all glassware be precleaned by soaking in wash acid for 2 hours.

4.4.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sample rate.

4.5 *Beryllium train operation.*—4.5.1 For each run, measure the velocity at the selected sampling point. Determine the isokinetic sampling rate. Record the velocity head and the required sampling rate.

4.5.2 Place the nozzle at the sampling point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. At the conclusion of the test, record the sampling rate. Again measure the velocity head at the sampling point. The required isokinetic rate at the end of the period should not have deviated more than 20 percent from that originally calculated.

4.5.3 Sample at a minimum rate of 0.5 ft³/min. Samples shall be taken over such a period or periods as are necessary to determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow determination or calculation of the emissions which would occur over the duration of the cycle. A minimum sampling time of 2 hours is recommended.

4.5.4 All pertinent data should be included in the test report.

4.6 *Sample recovery.*—4.6.1 It is recommended that all glassware be precleaned as in § 4.4.1. Sample recovery should also be performed in an area free of possible beryllium contamination. When the sampling train is moved, exercise care to prevent breakage and contamination. Set aside a portion of the acetone used in the sample recovery as a blank for analysis. The total amount of acetone used should be measured for accurate blank correction. Blanks can be eliminated if prior analysis shows negligible amounts.

4.6.2 Remove the filter and any loose particulate matter from filter holder and place in a container.

4.6.3 Clean the probe with acetone and a brush or long rod and cotton balls. Wash into the container. Wash out the filter holder with acetone and add to the same container.

4.7 *Analysis.*—4.7.1 Make the necessary preparation of samples and analyze for beryllium. Any currently acceptable method such as atomic absorption, spectrographic, fluorometric, chromatographic, or equivalent may be used.

5. *Calibration and standards*—5.1 *Sampling train.*—5.1.1 As a procedural check, sampling rate regulation should be compared with a dry gas meter, spirometer, rotameter (calibrated for prevailing atmospheric conditions), or equivalent, attached to nozzle inlet of the complete sampling train.

5.1.2 Data from this test and calculations should be shown in test report.

5.2 *Analysis.*—5.2.1 Standardization is made as suggested by the manufacturer of the instrument or the procedures for the analytical method.

6. *Calculations*—6.1 *Total beryllium emission.* Calculate the total amount of beryllium emitted from each stack per day by equation 103–2. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R=\frac{W_t(v_s)_{avg.}A_s}{V_{total}}\times\frac{86{,}400\ \text{seconds/day}}{10^6\ \mu g/g}$$

where:

R=Rate of emission, g/day.
W_t=Total weight of beryllium collected, μg.
V_{total}=Total volume of gas sampled, ft³.
$(v_s)_{avg.}$=Average stack gas velocity, feet per second.
A_s=Stack area, ft².

7. *Test report.* 7.1 A test report shall be prepared which shall include as a minimum:

7.1.1 A detailed description of the sampling train used and results of the procedural check with all data and calculations made.

7.1.2 All pertinent data taken during test, the basis for any estimates made, calculations, and results.

7.1.3 A description of the test site, including a block diagram with a brief description of the process, location of the sample points in the cross section, dimensions and distances from any point of disturbance.

METHOD 104. REFERENCE METHOD FOR DETERMINATION OF BERYLLIUM EMISSIONS FROM STATIONARY SOURCES

1. *Principle and applicability*—1.1 *Principle.*—Beryllium emissions are isokinetically sampled from the source, and the collected sample is digested in an acid solution and analyzed by atomic absorption spectrophotometry.

1.2 *Applicability.*—This method is applicable for the determination of beryllium emissions in ducts or stacks at stationary sources. Unless otherwise specified, this method is not intended to apply to gas streams other than those emitted directly to the atmosphere without further processing.

2. *Apparatus*—2.1 *Sampling train.*—A schematic of the sampling train used by EPA is shown in figure 104–1. Commercial models of this train are available, although construction details are described in APTD–0581,[1] and operating and maintenance procedures are described in APTD–0576. The components essential to this sampling train are the following:

2.1.1 *Nozzle.*—Stainless steel or glass with sharp, tapered leading edge.

2.1.2 *Probe.*—Sheathed Pyrex[2] glass. A heating system capable of maintaining a minimum gas temperature in the range of the stack temperature at the probe outlet during sampling may be used to prevent condensation from occurring.

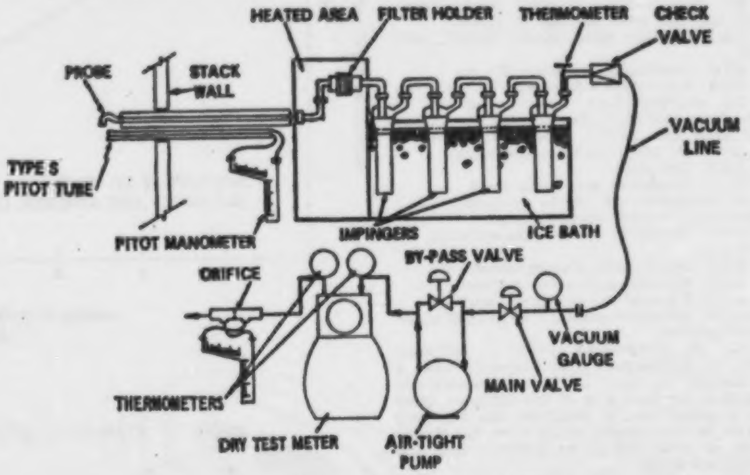

Figure 104-1. Beryllium sampling train

2.1.3 *Pitot tube.*—Type S (figure 104–2), or equivalent, with a coefficient within 5 percent over the working range, attached to probe to monitor stack gas velocity.

2.1.4 *Filter holder.*—Pyrex glass. The filter holder must provide a positive seal against leakage from outside or around the filter. A heating system capable of maintaining the filter at a minimum temperature in the range of the stack temperature may be used to prevent condensation from occurring.

2.1.5 *Impingers.*—Four Greenburg-Smith impingers connected in series with glass ball joint fittings. The first, third, and fourth impingers may be modified by replacing the tip with a ½-inch i.d. glass tube extending to one-half inch from the bottom of the flask.

2.1.6 *Metering system.*—Vacuum gauge, leakless pump, thermometers capable of measuring temperature to within 5° F, dry gas meter with 2 percent accuracy, and related equipment, described in APTD–0581, to maintain an isokinetic sampling rate and to determine sample volume.

2.1.7 *Barometer.*—To measure atmospheric pressure to ± 0.1 in Hg.

2.2 *Measurement of stack conditions (stack pressure, temperature, moisture and velocity)*—2.2.1 *Pitot tube.*—Type S, or equivalent, with a coefficient within 5 percent over the working range.

2.2.2 *Differential pressure gauge.*—Inclined manometer, or equivalent, to measure velocity head to within 10 percent of the minimum value.

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[1] These documents are available for a nominal cost from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Va. 22151.

[2] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

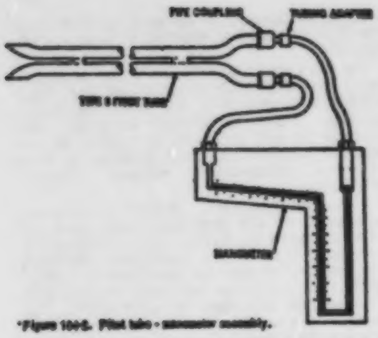

*Figure 104-2. Pitot tube - manometer assembly.

2.2.3 *Temperature gage.*—Any temperature measuring device to measure stack temperature to within 5° F.

2.2.4 *Pressure gage.*—Pilot tube and inclined manometer, or equivalent, to measure stack pressure to within 0.1 in Hg.

2.2.5 *Moisture determination.*—Wet and dry bulb thermometers, drying tubes, condensers, or equivalent, to determine stack gas moisture content to within 1 percent.

2.3 *Sample recovery*—2.3.1 *Probe cleaning rod.*—At least as long as probe.

2.3.2 *Leakless glass sample bottles.*—500 ml.

2.3.3 *Graduated cylinder.*—250 ml.

2.3.4 *Plastic jar.*—Approximately 300 ml.

2.4 *Analysis*—2.4.1 *Atomic absorption spectrophotometer.*—To measure absorbance at 234.8 nm. Perkin Elmer Model 303, or equivalent, with N_2O/acetylene burner.

2.4.2 *Hot plate.*

2.4.3 *Perchloric acid fume hood.*

3. *Reagents*—3.1 *Stock reagents.*—3.1.1 *Hydrochloric acid.*—Concentrated.

3.1.2 *Perchloric acid.*—Concentrated, 70 percent.

3.1.3 *Nitric acid.*—Concentrated.

3.1.4 *Sulfuric acid.*—Concentrated.

3.1.5 *Distilled and deionized water.*

3.1.6 *Beryllium powder.*—98 percent minimum purity.

3.2 *Sampling*—3.2.1 *Filter.* — Millipore AA, or equivalent. It is suggested that a Whatman 41 filter be placed immediately against the back side of the Millipore filter as a guard against breaking the Millipore filter. In the analysis of the filter, the Whatman 41 filter should be included with the Millipore filter.

3.2.2 *Silica gel.*—Indicating type, 6 to 16 mesh, dried at 350° F for 2 hours.

3.2.3 *Distilled and deionized water.*

3.3 *Sample recovery*—3.3.1 *Distilled and deionized water.*

3.3.2 *Acetone.*—Reagent grade.

3.3.3 *Wash acid.*—1.1 V/V hydrochloric acid-water.

3.4 *Analysis.*—3.4.1 *Sulfuric acid solution, 12 N.*—Dilute 333 ml of concentrated sulfuric acid to 1 l with distilled water.

3.4.2 *25 percent V/V hydrochloric acid-water.*

3.5 *Standard beryllium solution*—3.5.1 *stock solution.*—1 µg/ml beryllium. Dissolve 10 mg of beryllium in 80 ml of 12 N sulfuric acid solution and dilute to a volume of 1000 ml with distilled water. Dilute a 10 ml aliquot to 100 ml with 25 percent V/V hydrochloric acid, giving a concentration of 1 µg/ml. This dilute stock solution should be prepared fresh daily. Equivalent strength (in beryllium) stock solutions may be prepared from beryllium salts as $BeCl_2$ and $Be(NO_3)_2$ (98 percent minimum purity).

4. *Procedure.* 4.1 Guidelines for source testing are detailed in the following sections. These guidelines are generally applicable; however, most sample sites differ to some degree and temporary alterations such as stack extensions or expansions often are required to insure the best possible sample site. Further, since beryllium is hazardous, care should be taken to minimize exposure. Finally, since the total quantity of beryllium to be collected is quite small, the test must be carefully conducted to prevent contamination or loss of sample.

4.2 Selection of a sampling site and minimum number of traverse points.

4.2.1 Select a suitable sampling site that is as close as practicable to the point of atmospheric emission. If possible, stacks smaller than 1 foot in diameter should not be sampled.

4.2.2 The sampling site should be at least 8 stack or duct diameters downstream and 2 diameters upstream from any flow disturbance such as a bend, expansion or contraction. For a rectangular cross-section, determine an equivalent diameter from the following equation:

$$D_e = \frac{2LW}{L+W} \qquad \text{eq. 104-1}$$

where:

D_e = equivalent diameter
L = length
W = width

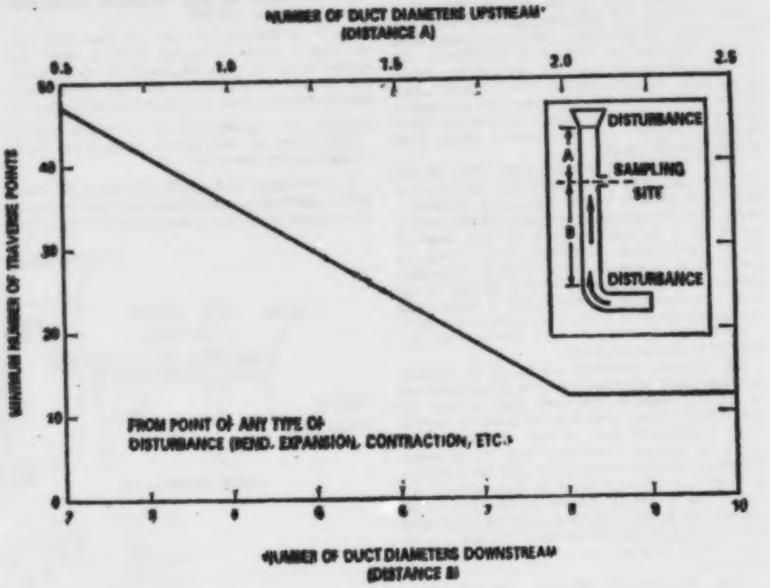

Figure 101-3. Minimum number of traverse points.

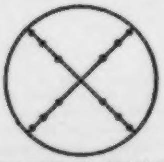

Figure 104-4. Cross section of circular stack showing location of traverse points on perpendicular diameters.

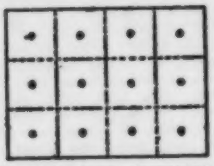

Figure 104-5. Cross section of rectangular stack divided into 12 equal areas, with traverse points at centroid of each area.

4.2.3 When the above sampling site criteria can be met, the minimum number of traverse points is four (4) for stacks 1 foot in diameter or less, eight (8) for stacks larger than 1 foot but 2 feet in diameter or less, and twelve (12) for stacks larger than 2 feet.

4.2.4 Some sampling situations may render the above sampling site criteria impractical. When this is the case, choose a convenient sampling location and use figure 104-3 to determine the minimum number of traverse points. However, use figure 104-3 only for stacks 1 foot in diameter or larger.

4.2.5 To use figure 104-3, first measure the distance from the chosen sampling location to the nearest upstream and downstream disturbances. Divide this distance by the diameter or equivalent diameter to determine the distance in terms of pipe diameters. Determine the corresponding number of traverse points for each distance from figure 104-3. Select the higher of the two numbers of traverse points, or a greater value, such that for circular stacks the number is a multiple of four, and for rectangular stacks the number follows the criteria of section 4.2.3.

4.2.6 If a selected sampling point is closer than 1 inch from the stack wall, adjust the location of that point to ensure that the sample is taken at least 1 inch away from the wall.

4.3 Cross-sectional layout and location of traverse points.

Table 104-1. Location of traverse points in circular stacks

(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.3	2.5	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.7	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.5	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.5	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.3	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.5	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.5	36.6	28.3	23.6	20.4	18.0	16.1
8				96.7	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.1	23.0
10					97.5	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.9	67.7
15								96.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

4.3.1 For circular stacks locate the traverse points on at least two diameters according to figure 104-4 and table 104-1. The traverse axes shall divide the stack cross section into equal parts.

4.3.2 For rectangular stacks divide the cross section into as many equal rectangular areas as traverse points, such that the ratio of the length to the width of the elemental areas is between 1 and 2. Locate the traverse points at the centroid of each equal area according to figure 104-5.

4.4 *Measurement of stack conditions.*—4.4.1 Set up the apparatus as shown in figure 104-2. Make sure all connections are tight and leak free. Measure the velocity head and temperature at the traverse points specified by §§ 4.2 and 4.3.

4.4.2 Measure the static pressure in the stack.

4.4.3 Determine the stack gas moisture.

4.4.4 Determine the stack gas molecular weight from the measured moisture content and knowledge of the expected gas stream composition. A standard Orsat analyzer has been found valuable at combustion sources. In all cases, sound engineering judgment should be used.

4.5 *Preparation of sampling train.*—4.5.1 Prior to assembly, clean all glassware (probe, impingers, and connectors) by soaking in wash acid for 2 hours. Place 100 ml of distilled water in each of the first two impringers, leave the third impinger empty, and place approximately 200 g of preweighted silica gel in the fourth impinger. Save a portion of the distilled water as a blank in the sample analysis. Set up the train and the probe as in figure 104-1.

4.5.2 Leak check the sampling train at the sampling site. The leakage rate should not be in excess of 1 percent of the desired sampling rate. If condensation in the probe or filter is a problem, probe and filter heaters will be required. Adjust the heaters to provide a temperature at or above the stack temperature. However, membrane filters such as the Millipore AA are limited to about 225° F. If the stack gas is in excess of about 200° F., consideration should be given to an alternate procedure such as moving the filter holder downstream of the first impinger to insure that the filter does not exceed its temperature limit. Place crushed ice around the impingers. Add more ice during the test to keep the temperature of the gases leaving the last impinger at 70° F. or less.

4.6 *Beryllium train operation.*—4.6.1 For each run, record the data required on the example sheet shown in figure 104-6. Take readings at each sampling point at least every 5 minutes and when significant changes in stack conditions necessitate additional adjustments in flow rate.

4.6.2 Sample at a rate of 0.5 to 1.0 ft.³/min. Samples shall be taken over such a period or periods as are necessary to accurately determine the maximum emissions which would occur in a 24-hour period. In the case of cyclic operations, sufficient tests shall be made so as to allow accurate determination or calculation of the emissions which will occur over the duration of the cycle. A minimum sample time of 2 hours is recommended.

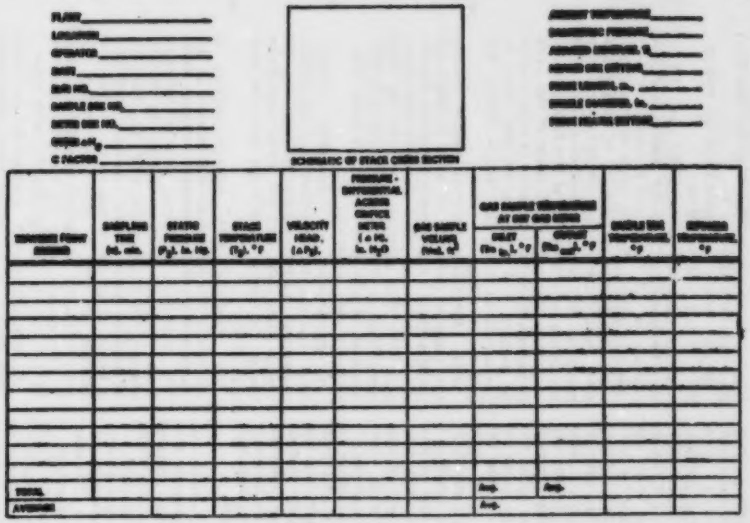
C FACTOR
SCHEMATIC OF STACK CROSS SECTION
TOTAL
AVERAGE
Avg.

Figure 104-6. Field data

4.6.3 To begin sampling, position the nozzle at the first traverse point with the tip pointing directly into the gas stream. Immediately start the pump and adjust the flow to isokinetic conditions. Sample for at least 5 minutes at each traverse point; sampling time must be the same for each point. Maintain isokinetic sampling throughout the sampling period. Nomographs which aid in the rapid adjustment of the sampling rate without other computations are in APTD-0576 and are available from commercial suppliers. Note that standard monographs are applicable only for type S pitot tubes and air or a stack gas with an equivalent density. Contact EPA or the sampling train supplier for instructions when the standard monograph is not applicable.

4.6.4 Turn off the pump at the conclusion of each run and record the final readings. Immediately remove the probe and nozzle from the stack and handle in accordance with the sample recovery process described in § 4.7.

4.7 *Sample recovery.*—4.7.1 (All glass storage bottles and the graduated cylinder must be precleaned as in § 4.5.1.) This operation should be performed in an area free of possible beryllium contamination. When the sampling train is moved, care must be exercised to prevent breakage and contamination.

4.7.2 Disconnect the probe from the impinger train. Remove the filter and any loose particulate matter from the filter holder and place in a sample bottle. Place the contents (measured to ±1 ml) of the first three impingers into another sample bottle. Rinse the probe and all glassware between it and the back half of the third impinger with water and acetone, and add this to the latter sample bottle. Clean the probe with a brush or a long slender rod and cotton balls. Use acetone while cleaning. Add these to the sample bottle. Retain a sample of the water and acetone as a blank. The total amount of wash water and acetone used should be measured for accurate blank correction. Place the silica gel in the plastic jar. Seal and secure all sample containers for shipment. If an additional test is desired, the glassware can be carefully double rinsed with distilled water and reassembled. However, if the glassware is to be out of use more than 2 days, the initial acid wash procedure must be followed.

4.8. Analysis.

4.8.1 *Apparatus preparation.*—Clean all glassware according to the procedure of section 4.5.1. Adjust the instrument settings according to the instrument manual, using an absorption wavelength of 234.8 nm.

4.8.2 *Sample preparation.*—The digestion of beryllium samples is accomplished in part in concentrated perchloric acid. *Caution*: The analyst must insure that the sample is heated to light brown fumes after the initial nitric acid addition; otherwise, dangerous perchlorates may result from the subsequent perchloric acid digestion. Perchloric acid also should be used only under a perchloric acid hood.

4.8.2.1 Transfer the filter and any loose particulate matter from the sample container to a 150 ml beaker. Add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy all organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.2 Place a portion of the water and acetone sample into a 150 ml beaker and put on a hotplate. Add portions of the remainder as evaporation proceeds and evaporate to dryness. Cool the residue and add 35 ml concentrated nitric acid. Heat on a hotplate until light brown fumes are evident to destroy any organic matter. Cool to room temperature and add 5 ml concentrated sulfuric acid, and 5 ml concentrated perchloric acid. Then proceed with step 4.8.2.4.

4.8.2.3 Weigh the spent silica gel and report to the nearest gram.

4.8.2.4 Samples from 4.8.2.1 and 4.8.2.2 may be combined here for ease of analysis. Replace on a hotplate and evaporate to dryness in a perchloric acid hood. Cool and dissolve the residue in 10.0 ml of 25 percent V/V hydrochloric acid. Samples are now ready for the atomic absorption unit. The beryllium concentration of the sample must be within the calibration range of the unit. If necessary, further dilution of sample with 25 percent V/V hydrochloric acid must be performed to bring the sample within the calibration range.

4.8.3 *Beryllium determination.*—Analyze the samples prepared in 4.8.2 at 234.8 nm using a nitrous oxide/acetylene flame. Aluminum, silicon and other elements can interfere with this method if present in large quantities. Standard methods are available, however, to effectively eliminate these interferences (see Reference 5).

5. *Calibration*—5.1 *Sampling train.*—5.1.1 Use standard methods and equipment as detailed in APTD-0576 to calibrate the rate meter, pitot tube, dry gas meter and probe heater (if used). Recalibrate prior to each test series.

5.2 *Analysis.*—5.2.1 Standardization is made with the procedure as suggested by the manufacturer with standard beryllium solution. Standard solutions will be prepared from the stock solution by dilution with 25 percent V/V hydrochloric acid. The linearity of working range should be established with a series of standard solutions. If collected samples are out of the linear range, the samples should be diluted. Standards should be interspersed with the samples since the calibration can change slightly with time.

6. *Calculations*—6.1 *Average dry gas meter temperature, stack temperature, stack pressure and average orifice pressure drop.*—See data sheet (figure 104-6).

6.2 *Dry gas volume.*—Correct the sample volume measured by the dry gas meter to stack conditions by using equation 104-2.

$$V_{m_s} = V_m \frac{T_s}{T_m} \frac{\left(P_{bar} + \frac{\Delta H}{13.6}\right)}{P_s} \qquad \text{eq. 104-2}$$

where:

V_{m_s}=Volume of gas sample through the dry gas meter (stack conditions), ft³.

V_m=Volume of gas sample through the dry gas meter (meter conditions), ft³.

T_s=Average temperature of stack gas, °R.

T_m=Average dry gas meter temperature, °R.

P_{bar}=Barometric pressure at the orifice meter, in Hg.

ΔH=Average pressure drop across the orifice meter, in H₂O.

13.6=Specific gravity of mercury.

P_s=Stack pressure, P_{bar} ± static pressure, in Hg.

6.3 *Volume of water vapor.*

$$W_{w_s} = K_w V_{l_c} \frac{T_s}{P_s} \qquad \text{eq. 104-3}$$

where:

V_{w_s}=Volume of water vapor in the gas sample (stack conditions), ft³.

$K_w = 0.00267 \frac{\text{inHg-ft}^3}{\text{ml-°R}}$, when these units are used.

V_{l_c}=Total volume of liquid collected in impingers and silica gel (see figure 104-7), ml.

T_s=Average stack gas temperature, °R.

P_s=Stack pressure, P_{bar}±static pressure, in Hg.

6.4 *Total gas volume.*

$$V_{total} = V_{m_s} + V_{w_s} \qquad \text{eq. 104-4}$$

where:

V_{total}=Total volume of gas sample (stack conditions), ft³.

V_{m_s}=Volume of gas through dry gas meter (stack conditions), ft³.

V_{w_s}=Volume of water vapor in gas sample (stack conditions), ft³.

6.5 *Stack gas velocity.*

Use equation 104-5 to calculate the stack gas velocity.

$$(v_s)_{avg.} = K_p C_p (\sqrt{\Delta p})_{avg.} \sqrt{\frac{(T_s)_{avg.}}{P_s M_s}} \qquad \text{eq. 104-5}$$

where:

$(v_s)_{avg.}$=Average stack gas velocity, feet per second.

$K_p = 85.48 \frac{\text{ft}}{\text{sec}} \left(\frac{\text{lb-inHg}}{\text{lb mole-°R-inH}_2\text{O}}\right)^{1/2}$, when these units are used.

C_p=Pitot tube coefficient, dimensionless.

$(T_s)_{avg.}$=Average stack gas temperature, °R.

$(\sqrt{\Delta p})_{avg.}$=Average square root of the velocity head of stack gas $(\text{inH}_2\text{O})^{1/2}$ (see figure 104-6).

P_s=Stack pressure, P_{bar}±static pressure, in Hg.

M_s=Molecular weight of stack gas (wet basis), the summation of the products of the molecular weight of each component multiplied by its volumetric proportion in the mixture, lb/lb-mole.

	VOLUME OF LIQUID WATER COLLECTED	
	IMPINGER VOLUME, ml	SILICA GEL WEIGHT, g
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL VOLUME COLLECTED		g* ml

*CONVERT WEIGHT OF WATER TO VOLUME BY dividing total weight INCREASE BY DENSITY OF WATER. (1 g/ml)

$$\frac{\text{INCREASE, g}}{(1\ \text{g/ml})} = \text{VOLUME WATER, ml}$$

Figure 104-7. Analytical data.

PLANT____________________________

DATE____________________________

RUN NO.__________________________

STACK DIAMETER, in.__________________

BAROMETRIC PRESSURE, in. Hg.____________

STATIC PRESSURE IN STACK (P_g), in. Hg.________

OPERATORS__________________________

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Velocity head, in. H_2O	$\sqrt{\Delta_p}$	Stack Temperature (T_s), °F
	AVERAGE:		

Figure 104-8. Velocity traverse data.

Figure 104-8 shows a sample recording sheet for velocity traverse data. Use the averages in the last two columns of figure 104-8 to determine the average stack gas velocity from equation 104-5.

6.6 *Beryllium collected.*—Calculate the total weight of beryllium collected by using equation 104-6.

$$W_t = V_t C_t - V_w C_w - V_a C_a \quad \text{eq. 104-6}$$

where:

W_t = Total weight of beryllium collected, μg.

V_t = Total volume of hydrochloric acid from step 4.8.2.4, ml.

C_t = Concentration of beryllium found in sample, μg/ml.

V_w = Total volume of water used in sampling (impinger contents plus all wash amounts), ml.

C_w = Blank concentration of beryllium in water, μg/ml.

V_a = Total volume of acetone used in sampling (all wash amounts), ml.

C_a = Blank concentration of beryllium in acetone, μg/ml.

6.7 *Total beryllium emissions.*—Calculate the total amount of beryllium emitted from each stack per day by equation 104-7. This equation is applicable for continuous operations. For cyclic operations, use only the time per day each stack is in operation. The total beryllium emissions from a source will be the summation of results from all stacks.

$$R = \frac{W_t (v_s)_{avg.} A_s}{V_{total}} \times \frac{86{,}400 \text{ seconds/day}}{10^6 \text{ μg/g}} \quad \text{eq. 104-7}$$

where:

R = Rate of emission, g/day.

W_t = Total weight of beryllium collected, μg.

V_{total} = Total volume of gas sample (stack conditions), ft³.

$(v_s)_{avg.}$ = Average stack gas velocity, feet per second.

A_s = Stack area, ft².

6.8 *Isokinetic variation (comparison of velocity of gas in probe tip to stack velocity).*

$$I=\frac{100V_{total}}{A_n\Theta(vs)_{avg.}}$$

eq. 104-8

where:

I=Percent of isokinetic sampling.
V_{total}=Total volume of gas sample (stack conditions), ft³.
A_n=Probe tip area, ft².
Θ=Sampling time, sec.
$(vs)_{avg.}$=Average stack gas velocity, feet per second.

7. *Evaluation of results*—7.1 *Determination of compliance.*—7.1.1 Each performance test shall consist of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, the average of results of all repetitions shall apply.

7.2 *Acceptable isokinetic results.*—7.2.1 The following range sets the limit on acceptable isokinetic sampling results:

If 90 percent ≤I≤110 percent, the results are acceptable; otherwise, reject the test and repeat.

8. *References.*—1. Addendum to Specifications for Incinerator Testing at Federal Facilities, PHS, NCAPC, December 6, 1967.

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16. Standard Method for Sampling Stacks for Particulate Matter, In: 1971 Book of ASTM standards, Part 23, Philadelphia, 1971, ASTM Designation D-2928-71.

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[FR Doc. 73-6423 Filed 4-5-73;8:45 am]

2

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Asbestos, Beryllium, and Mercury

Pursuant to section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7), the Administrator of the Environmental Protection Agency promulgated national emission standards for the hazardous air pollutants asbestos, beryllium, and mercury on April 6, 1973 (38 FR 8820). The subsequent enforcement of these regulations has demonstrated a need for the clarifying revisions which follow. These revisions are necessary to advise the public of how the regulations are being interpreted in Agency enforcement activities. The revisions promulgated herein do not alter the stringency of the regulations.

A change to Subpart A, General Provisions, which applies to all affected sources, is promulgated. The definition of "alternative method" is revised to indicate more clearly that it is not a "reference method" or "equivalent method" and to make the definition consistent with that used in 40 CFR Part 60, Standards of Performance for New Stationary Sources.

The applicability of the asbestos regulation is discussed in the following documents which are available on request from the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin:

1. Preamble to the proposed regulation (36 FR 23239)
2. Background information document for the proposed regulation (APTD-0753)
3. Preamble to the promulgated regulation (38 FR 8820)
4. Background information document for the promulgated regulation (APTD-1503)

Comments from the owners or operators of affected sources and from Agency regional enforcement personnel have indicated, however, that the intent should be specifically expressed in the text of the regulation. Considering this, the Agency determined that the text of the promulgated regulation should be revised and four definitions are added to clarify the applicability of 40 CFR Part 61, Subpart B, National Emission Standard for Asbestos.

The definition of "commercial asbestos" is added to distinguish between asbestos that is produced as a product and asbestos that occurs as a contaminant ingredient in other materials, and to make it clear that materials that contain asbestos as a contaminant only are not covered. Questions were raised concerning the applicability of the standard to manufacturing operations that use talc and vermiculite. As indicated on page 6 of the background information report for the proposed standards (APTD-0753), talc mines were not covered by the proposed standards; this was also intended to indicate that manufacturing operations that use talc or other materials contaminated with asbestos were not covered by the asbestos standard. In addition, the information available to the Agency at the time of promulgation (April 6, 1973) did not demonstrate that the mining and milling of such materials or manufacturing operations using such materials were major sources of asbestos emissions. The Department of the Interior and the Department of Health, Education and Welfare are studying the health effects of asbestos in talc. The revisions promulgated herein merely clarify the regulations promulgated April 6, 1973, and do not involve prejudgments concerning the outcome of investigations now underway.

Asbestos is also a contaminant in taconite ore. EPA at this time believes that asbestos releases from the milling of such ores should be covered by the hazardous air pollutant regulations and intends in the near future to propose for comment regulations which would accomplish this. Because the revisions here being promulgated are only clarifications of the Agency's intentions at the time the initial hazardous air pollutant regulations for asbestos were published and because they are not being proposed for comment, EPA believes that it is not appropriate to include restrictions on releases of asbestos from taconite milling operations in these revisions.

The regulation promulgated on April 6, 1973, did not include a definition for "asbestos mill" or "manufacturing" operation, and questions arose concerning whether certain operations at these facilities are covered by the regulation, and whether the regulation applies to all milling and manufacturing operations that process ore or materials that contain asbestos. The definition of "asbestos mill" is added to clarify that the regulation covers ore crushing and conveying of asbestos tailings to disposal piles but does not cover open storage areas and asbestos tailings disposal piles. This was explained in the preamble to the promulgated regulations (38 FR 8821) and on pages 30 and 31 of the background information report (APTD-1503). The definition excludes the milling of ores that contain asbestos minerals only as a contaminant as previously discussed under the definition of "commercial asbestos." As noted earlier, the Agency intends to propose regulations covering taconite milling operations.

The definition of "manufacturing" is added to clarify that the regulation applies to only those sources within the specified categories of affected manufacturing facilities that process commercial asbestos into a product. Operations which process (cut, shape, assemble, mix, or otherwise alter) a manufactured product that contains commercial asbestos at a separate location are not intended to be covered by the regulation, and are classified as fabricating rather than manufacturing operations. The information available to EPA prior to promulgation was that new construction sites were the only major sources of asbestos emissions from fabrication operations and that these sources were adequately regulated by Occupational Safety and Health Administration standards. This was explained in the preamble to the promulgated regulation (38 FR 8821) and on page 32 of the background information report (APTD-1503).

Some questions have arisen concerning what operations constitute demolition. The definition of "demolition" is added to clarify that demolition occurs only in situations where load-supporting structural members are wrecked or removed. Accordingly, the standard does not apply to remodeling and renovation operations in which load-supporting structural members are not wrecked.

The time allowed owners or operators to notify the Administrator prior to commencement of a demolition operation is changed from 20 days to 10 days, and the time basis for the notification is clarified to be the postmark date of the notice. Experience has shown that 20 days' notice is not necessary to provide sufficient time for effective enforcement of the regulation, and the shorter time will be more convenient to demolition contractors.

Some questions have arisen concerning whether all of the friable asbestos materials on pipes, boilers, or load-supporting structural members had to be wetted and stripped off prior to demolition. The wording in § 61.22(d)(2)(i) of the promulgated regulation states that the friable asbestos material has to be removed, but does not specify the procedure to be used. A statement is added to clarify that it is not necessary for friable asbestos material to be removed or stripped from boilers, pipes, or load-supporting structural members prior to the removal of these items as units or in sections, provided that the asbestos material exposed during removal is wetted. As required in § 61.22(d)(2)(iii), such units or sections must subsequently be carefully lowered or taken to the ground level.

A paragraph is added to clarify that the regulation is not violated when uncombined water is the sole reason a source fails to meet the no-visible-emissions requirement. This makes the no-visible-emissions regulation consistent with other similar Agency regulations.

The Agency is presently studying the extent of asbestos emission from dumps of asbestos tailings and open storage of asbestos ores, disposal of asbestos waste material, and asbestos fabricating operations. Beryllium and mercury emissions resulting from the incineration of sewage sludge are also being studied. These investigations are nearing completion and the Agency will determine whether it is necessary to regulate these sources of hazardous pollutants to provide an ample margin of safety to protect the public health. The revisions to the regulations promulgated herein merely clarify the regulations promulgated April 6, 1973, and do not preclude subsequent revisions to the regulations as indicated by the studies described above.

The Agency finds that good cause exists for not proposing these revisions and for making them effective upon publication since (1) the revisions make certain clarifications, but do not change the substance of the national emission standards for asbestos, beryllium, and mercury; and (2) there is a pressing need to promulgate these revisions so that the asbestos standard can be uniformly interpreted by industry personnel and enforced by the Agency. Therefore, the Administrator has determined that it is unnecessary to publish a notice of proposed rulemaking or delay the effective date of this amendment and for the reasons cited has not done so.

The amendment of these regulations is promulgated pursuant to section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7), and is effective upon promulgation.

Dated: April 29, 1974.

JOHN QUARLES,
Acting Administrator.

Part 61, Chapter I, Title 40, Code of Federal Regulations is amended by revising Subparts A and B as follows:

Subpart A—General Provisions

1. Section 61.02 is amended by revising paragraph (c) to read as follows:

§ 61.02 Definitions.

* * * * *

(c) "Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference method or an equivalent method but which has been demonstrated to the Administrator's satisfaction to produce, in specific cases, results adequate for his determination of compliance.

* * * * *

Subpart B—National Emission Standard for Asbestos

2. Section 61.21 is amended by adding paragraphs (g), (h), (i), and (j). The added paragraphs read as follows:

§ 61.21 Definitions.

* * * * *

(g) "Asbestos mill" means any facility engaged in the conversion or any intermediate step in the conversion of asbestos ore into commercial asbestos. Outside storage of asbestos materials is not considered a part of such facility.

(h) "Commercial asbestos" means any variety of asbestos which is produced by extracting asbestos from asbestos ore.

(i) "Manufacturing" means the combining of commercial asbestos, or in the case of woven friction products the combining of textiles containing commercial asbestos, with any other material(s), including commercial asbestos, and the processing of this combination into a product as specified in § 61.22(c).

(j) "Demolition" means the wrecking or removal of any load-supporting structural member.

3. Section 61.22 is amended by revising paragraphs (a), (d)(1), (d)(2)(i), and (d)(4), and by adding paragraph (g). The revised and added paragraphs read as follows:

§ 61.22 Emission standard.

(a) Asbestos mills: There shall be no visible emissions to the outside air from any asbestos mill except as provided in paragraph (f) of this section.

* * * * *

(d) * * *

(1) Written notice of intention to demolish shall be provided to the Administrator by the owner or operator of the demolition operation. Such notice shall be postmarked at least 10 days prior to commencement of such demolition, or anytime prior to commencement of demolition subject to paragraph (d)(4) of this section. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished.

(iv) Address or location of the building, structure, facility or installation.

(v) Scheduled starting and completion dates of demolition.

(vi) Method of demolition to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph.

(2) * * *

(i) Friable asbestos materials, used to insulate or fireproof any boiler, pipe, or load-supporting structural member, shall be wetted and removed from any building, structure, facility, or installation subject to this paragraph before wrecking of load-supporting structural members is commenced. Boilers, pipe, or load-supporting structural members that are insulated or fireproofed with friable asbestos materials may be removed as units or in sections without stripping or wetting, except that where the boiler, pipe, or load-supporting structural member is cut or disjointed, the exposed friable asbestos materials shall be wetted. Friable asbestos debris shall be wetted adequately to insure that such debris remains wet during all stages of demolition and related handling operations.

* * * * *

(4) Any owner or operator of a demolition operation who intends to demolish a building, structure, facility, or installation to which the provisions of this paragraph would be applicable but which has been declared by proper State or local authority to be structurally unsound and which is in danger of imminent collapse is exempt from the requirements of this paragraph other than the reporting requirements specified by paragraph (d)(1) of this section and the wetting of friable asbestos debris as specified by paragraph (d)(2)(i) of this section.

* * * * *

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), or (e) of this section, such failure shall not be a violation of such emission requirements.

[FR Doc.74-10252 Filed 5-2-74;8:45 am]

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Title 40—Protection of the Environment

[FRL 286-2]

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Region V Office: New Address

The Region V Office of EPA has been relocated. The new address is: EPA, Region V, Federal Building, 230 South Dearborn, Chicago, Illinois 60604. This change revises Region V's office address appearing in §§ 52.16, 60.4 and 61.04 of Title 40, Code of Federal Regulations.

Dated: October 21, 1974.

ROGER STRELOW,
Assistant Administrator for
Air and Waste Management.

Parts 52, 60 and 61, Chapter I, Title 40 of the Code of Federal Regulations are amended as follows:

§§ 52.16, 60.4, 61.04 [Amended]

1. The address of the Region V office is revised to read:

Region V (Illinois, Indiana, Minnesota, Ohio, Wisconsin) Federal Building, 230 South Dearborn, Chicago, Illinois 60606.

[FR Doc.74-24919 Filed 10-24-74;8:45 am]

FEDERAL REGISTER, VOL. 39, NO. 208—FRIDAY, OCTOBER 25, 1974

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Washington

Pursuant to the delegation of authority for the national emission standards for hazardous air pollutants (NESHAPS) to the State of Washington on February 28, 1975, EPA is today amending 40 CFR 61.04 *Address*. A Notice announcing this delegation was published on April 1, 1975 (40 FR 14632). The amended § 61.04 is set forth below.

The Administrator finds good cause for making this rulemaking effective immediately as the change is an administrative change and not one of substantive content. It imposes no additional substantive burdens on the parties affected.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated April 21, 1975.

ROGER STRELOW,
Assistant Administrator for Air and Waste Management.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

Subpart A—General Provisions

1. Section 61.04 is revised to read as follows:

§ 61.04 Address.

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate and addressed to the appropriate Regional Office of the Environmental Protection Agency, to the attention of the Director, Enforcement Division. The regional offices are as follows:

Region I (Connecticut, Maine, New Hampshire, Massachusetts, Rhode Island, Vermont), John F. Kennedy Federal Building, Boston, Massachusetts 02203.

Region II (New York, New Jersey, Puerto Rico, Virgin Islands), Federal Office Building, 26 Federal Plaza (Foley Square), New York, N.Y. 10007.

Region III (Delaware, District of Columbia, Pennsylvania, Maryland, Virginia, West Virginia), Curtis Building, Sixth and Walnut Streets, Philadelphia, Pennsylvania 19106.

Region IV (Alabama, Florida, Georgia, Mississippi, Kentucky, North Carolina, South Carolina, Tennessee), Suite 300, 1421 Peachtree Street, Atlanta, Georgia 30309.

Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Illinois 60606.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas), 1600 Patterson Street, Dallas, Texas 75201.

Region VII (Iowa, Kansas, Missouri, Nebraska), 1735 Baltimore Street, Kansas City, Missouri 64108.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming), 196 Lincoln Towers, 1860 Lincoln Street, Denver, Colorado 80203.

Region IX (Arizona, California, Hawaii, Nevada, Guam, American Samoa), 100 California Street, San Francisco, California 94111.

Region X (Washington, Oregon, Idaho, Alaska), 1200 Sixth Avenue, Seattle, Washington 98101.

(b) Section 112(d) directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce the national emission standards for hazardous air pollutants for stationary sources located in such State. All information required to be submitted to EPA under paragraph (a) of this section, must also be submitted to the appropriate State Agency of any State to which this authority has been delegated (provided, that each specific delegation may exempt sources from a certain federal or State reporting requirement). The appropriate mailing address for those States whose delegation request has been approved is as follows:

(A)-(Z) [reserved].
(AA)-(VV) [reserved].
WW-Washington; State of Washington, Department of Ecology, Olympia, Washington 98504.
(XX)-(ZZ) [reserved].
(AAA)-(DDD) [reserved].

[FR Doc.75-10798 Filed 4-24-75;8:45 am]

FEDERAL REGISTER, VOL. 40, NO. 81—FRIDAY, APRIL 25, 1975

[FRL 439-8]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Bay Area, Monterey Bay Unified, Humboldt County and Del Norte County Air Pollution Control Districts

Pursuant to the delegations of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Bay Area and Monterey Bay Unified Air Pollution Control Districts (dated May 23, 1975), and on behalf of the Humboldt County and Del Norte County Air Pollution Control Districts (dated July 10, 1975), EPA is today amending 40 CFR 61.04, *Address*, to reflect these delegations. Notices announcing these delegations are published today in the Notices Section of this issue. The amended § 61.04 is set forth below. It adds the addresses of the Bay Area, Monterey Bay Unified, Humboldt County, and Del Norte County Air Pollution Control Districts, to which must be addressed all reports, requests applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on May 23, 1975 (Bay Area and Monterey Bay Districts), and on July 10, 1975 (Humboldt County and Del Norte County Districts), and it serves no purpose to delay the technical change of this addition of the Air Pollution District addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: September 6, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (F), to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *
(A)-(E) * * *
(F) California.
Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

* * * * *

[FR Doc.75-24203 Filed 9-10-75;8:45 am]

FEDERAL REGISTER, VOL. 40, NO. 177—THURSDAY, SEPTEMBER 11, 1975

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[FRL 438-4]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Kern County and Trinity County Air Pollution Control Districts

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Kern County Air Pollution Control District and the Trinity County Air Pollution Control District, dated August 18, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published today at 40 FR 45221. The amended § 61.04 is set forth below. It adds the addresses of the Kern County and Trinity County Air Pollution Control Districts, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 18, 1975, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: September 25, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F, to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)–(E) * * *

F—California—

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

* * * * *

[FR Doc.75-26272 Filed 9-30-75;8:45 am]

7 **Title 40—Protection of Environment**

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 431-2]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Amendments to Standards for Asbestos and Mercury

On October 25, 1974 (39 FR 38064), pursuant to section 112 of the Clean Air Act, as amended, the Administrator proposed amendments to national emission standards for the hazardous air pollutants asbestos and mercury. The Administrator also proposed amendments to Appendix B, Test Methods, of this part.

Interested persons representing industry, trade associations, environmental groups, and Federal, State and local governments participated in the rulemaking by sending comments to the Agency. Commentators submitted 40 letters, many with multiple comments. The comments have been considered, and the proposed amendments have been reevaluated. Each comment, some of which were submitted by more than one party, has been separately addressed in writing by the Agency. The Freedom of Information Center, Room 202 West Tower, 401 M Street, SW, Washington, D.C. has copies of the comment letters received and a summary of the issues and Agency responses available for public inspection. In addition, copies of the issue summary and Agency responses may be obtained upon written request from the EPA Public Information Center (PM-215), 401 M Street, S.W., Washington, D.C. 20460 (specify Public Comment Summary—Proposed Amendments to National Emission Standards for Hazardous Air Pollutants—Asbestos and Mercury). Where determined by the Administrator to be appropriate, changes have been made to the proposed amendments, and the revised version of the amendments to the national emission standards for asbestos and mercury is promulgated herein. The principal changes to the proposed amendments and the Agency's responses to the major comments received are summarized below.

Copies of *Background Information on National Emission Standards for Hazardous Air Pollutants—Proposed Amendments to Standards for Asbestos and Mercury* (EPA-450/2-74-009a) which explains the basis for the proposed amendments are available on request from the Emission Standards and Engineering Division, Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin.

ASBESTOS

CHANGES TO PROPOSED AMENDMENTS

Manufacturing. The Agency received numerous comments stating that the proposed amendments should apply only to asphalt concrete manufacturing plants that use asbestos. This was the Agency's intent. Section 61.22(c) has been revised by the addition of the wording, "that use commercial asbestos."

Demolition and Renovation. A comment was received during review of the amendments within the Agency that ducts can be insulated with amounts of friable asbestos material similar to those on boilers, tanks, reactors, turbines, furnaces and structural members, and should be covered by the demolition and renovation regulations. Since demolition and renovation operations can involve ducts insulated with appreciable quantities of friable asbestos material, "ducts" has been added to the list of apparatus that are covered by the amendments.

The comment was made that the quantity of friable asbestos material proposed as the minimum amount for establishing renovation operations as major sources of asbestos subject to the proposed amendments was arbitrary, but should also apply to demolition operations. The Agency explained in the preamble to the proposed amendments that this amount of asbestos is typically contained in a four-unit apartment building, which is the maximum size for apartment buildings excluded from the demolition provisions. Therefore, the minimum quantity of friable asbestos material covered by the demolition and renovation provisions is essentially equivalent. The Agency considered applying regulations only to demolition operations in which more than a specified amount of friable asbestos material was involved, prior to promulgation of demolition provisions on April 6, 1973 (38 FR 8820). This approach was rejected primarily because it would complicate enforcement procedures. However, the Agency realizes that certain commercial buildings contain smaller amounts of friable asbestos material than the lower size cutoff limit proposed for renovating operations. On reevaluation, the Agency concluded that the available information justifies changing the proposed amendment to allow exemption of demolition operations involving less than 80 meters of friable asbestos pipe insulation and less than 15 square meters of friable asbestos material used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace or structural member. The owner or operator of a demolition operation desiring this exemption must notify the Administrator, at least 20 days prior to beginning demolition, of the measured or estimated amount of friable asbestos material involved in the demolition. This will permit the exception to be implemented without requiring prior inspection of every site by Agency personnel, which would be an excessive enforcement burden. This differs from the reporting requirements of the renovation provisions of the amendments. The nature of renovation operations necessitates a greater familiarity on the part of the operator with the quantities of friable asbestos materials present than for demolition operations. For this reason, the Agency believes that it is not necessary to require reports from all renovation operations in order to ensure effective enforcement of the renovation provisions that apply to only larger renovation operations.

Several comments were received which stated that operating machinery could be damaged by wetting procedures during certain renovation operations. The wetting during renovation of a heated boiler, near sensitive electric equipment, and over operating machinery in an industrial plant were mentioned as specific examples. One comment also stated that portable local exhaust ventilation systems are effective alternatives to wetting. The proposed amendments have been changed to allow the use of local exhaust ventilation systems when damage to equipment from wetting is unavoidable, provided that the system captures the asbestos particulate material produced during the removal of friable asbestos material and discharges no visible emissions from its exhaust. The Administrator will make determinations, upon request, of whether damage to equipment from wetting would be unavoidable.

Several comments were received which stated that the proposed frequency for submitting to the Agency written notices of intention to perform repetitive renovation work at a single facility was excessive. One commentator suggested that definitions for "emergency renovation" and "routine maintenance renovation" be included, and that a yearly filing of intention to renovate should be allowed for each industrial plant. It is evident from the comments received that some plants perform renovation operations very frequently, such as twice a week. The proposed reporting requirements for such plants would be excessive. The proposed amendment has been changed so that these requirements are reduced, and the applicability of the requirement is more clearly defined by adding more detailed language and definitions for "planned renovation" and "emergency renovation" operations. Additionally, the applicability of the amendment has been clarified by specifying how the quantities of asbestos involved in "planned renovation" and "emergency renovation" are to be determined. The basic characteristic that distinguishes the two types of renovation operations is the degree of predictability of their occurrence. The amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted for planned renovation operations, including both scheduled and non-scheduled operations, whereas no such prediction can be made for emergency renovation operations. The given period of time for predicting purposes has been specified to be between 30 days and one year for planned renovation operations involving individually non-scheduled operations. A reporting time shorter than 30 days would require the submission and review of a large number of reports, and predictions over periods longer than one year could give inaccurate predictions of friable asbestos material to be removed. In emergency renovation operations, the amount of friable asbestos material that is subject to the amendment is the total amount of such material that will be removed or stripped as a result of the individual emergency.

One commentator stated that the proposed amendment covering renovation could be circumvented by the carrying out of small portions, which are individually not subject to the amendment, of a larger operation. Section 61.17 has been added to the General Provisions to explicitly prevent this potential circumvention and to apply in general to circumvention of all standards promulgated under this part.

One commentator stated that a requirement in § 61.22(d)(2)(vi) of the proposed amendments was inconsistent and should be revised. This section required that friable asbestos material removed from buildings greater than 50 feet in height be transported to the ground via dust-tight chutes or containers. The cited inconsistency arises because this requirement applied at all heights, including those less than 50 feet, for a building 50 feet or gretaer in height, whereas it did not apply to buildings less than 50 feet in height. The requirement has been changed so that it applies only to materials that have been removed or stripped at more than 50 feet above ground level.

Several minor changes have been made in response to comments. Language has been added to allow delivery of notices of intention to renovate or demolish to the Administrator by means other than the U.S. mail. There is a minor clarifying language change between § 61.22(d)(2)(i) of the proposed demolition provisions and the corresponding provision, § 61.22(d)(4)(i), of the regulations promulgated herein. A comment suggested the term "adequately wetted" should be defined and differentiated from "thoroughly wetted," since both terms appeared in the proposed amendments. The use of these terms has been reevaluated, and a definition of "adequately wetted" has been added. The term "thoroughly wetted" has been deleted and the term "adequately wetted" has been used throughout.

The Agency has made a revision in the proposed requirement [§ 61.22(d)(1)] for notification of intention to perform renovation or demolition operations. An additional reporting requirement for the name and location of the waste disposal site where demolition and renovation waste will be deposited has been added to assist in enforcing the waste disposal provisions of the amendments.

Spraying. During review of the amendments within the Agency, a question arose concerning whether the waste generated by operations that use spray-on materials which contain less than one percent of asbestos by weight to insulate or fireproof buildings, structures, pipes and conduits was covered by the asbestos waste disposal amendment [§ 61.22(j)]. The spraying provisions do not apply to such operations, though reports of the operations were required by the standard promulgated on April 6, 1973. Therefore, the waste disposal processes associated with these operations are not regulated by the waste disposal amendments. Based on Agency enforcement experience since promulgation of the standard on April 6, 1973, the required reporting of spraying operations where less than 1 percent asbestos material is used is felt to be unnecessary. Accordingly, the Agency has revised the reporting requirements of paragraph 61.22(e) to apply only to spray-on insulation and fireproofing material that contains more than one percent asbestos by weight.

Waste Disposal. The proposed amendments would have applied directly to all waste disposal sites that accept asbestos waste from any emission source covered under the asbestos standard. The Agency estimated that approximately 2500 disposal sites would be covered. Review of these proposed amendments within the Agency indicated that enforcement would have required a disproportionate commitment of Agency resources. Alternative means of controlling asbestos emissions from waste disposal sites were therefore examined.

The number of acceptable waste disposal sites that meet the criteria in § 61.22(j)(3) of the proposed amendments, which are similar to the criteria for sanitary landfills, has increased significantly within the past several years and the trend is continuing in that direction. This trend is noted in a recent publication ("Waste Age," January 1975). This indicates that acceptable sites (i.e., private and municipal sanitary landfills) which follow practices that reduce asbestos emissions will be available for disposal of asbestos-containing waste. Therefore, it was determined that an effective means of reducing emissions from waste disposal sites without undue enforcement burdens would be to require already-regulated asbestos waste generators to dispose of asbestos-containing wastes at properly operated disposal sites. This is provided for in the amendments herein promulgated.

The Agency's greatest concern is with disposal sites which accept large quantities of asbestos waste. In most cases, companies which generate large quantities of asbestos-containing waste also own and operate their own disposal sites because of convenience and economics. For example, all domestic asbestos mills operate their own tailings disposal sites. The Agency anticipates that these large waste generators will operate their disposal sites in the future in compliance with the proposed § 61.22(l) in order to meet the requirement that they dispose of their waste at a acceptable sites.

Inactive disposal sites may also be major emission sources if they contain large amounts of asbestos waste. It is likely that at inactive sites containing small amounts of asbestos waste the asbestos is covered by non-asbestos waste, and the chance of significant asbestos emissions is small. It was decided to require that those inactive sites which are known to contain large quantities of asbestos comply with the standards specified in section 61.22(l) to reduce asbestos emissions. This category of asbestos waste disposal sites is usually operated by the sources that generate the asbestos-containing wastes, as noted above. Accordingly, the amendments promulgated herein apply to inactive disposal sites that have previously been operated by certain sources covered by the asbestos standard. The owner of such an inactivated site must comply with the amendments regardless of whether or not he generated the waste or operated the disposal site when it was active. This category of sites includes asbestos mill tailings disposal sites, and the large disposal sites at asbestos manufacturing and fabricating plants which have caused concern in the past. The owners or operators of spraying, demolition and renovation operations have not operated disposal sites in the past and are not expected to do so in the future. Due to the nature of such operations, the wastes generated are deposited at waste disposal sites which accept mostly non-asbestos-containing waste. As a result, the asbestos waste is effectively covered, thereby preventing emissions even in open dumps. For these reasons, inactive waste disposal sites that have been used by spraying, renovation and demolition are not regulated.

The amendments promulgated herein will control inactive asbestos waste disposal sites that contain large quantities of asbestos waste. The Agency's enforcement resources will be more effectively utilized since approximately 2000 waste disposal sites will not be directly regulated by the promulgated amendments. This should facilitate enforcement and protection of the public health.

The comment was made that the proposed permanent posting of warning signs at inactive asbestos waste disposal sites would be overly restrictive. The warning signs were intended primarily to warn the general public of the potential hazards that could result from creating dust by such disturbances as walking on exposed asbestos waste. If the disposal site is properly covered over as required by the alternative methods of complying with the proposed amendment for waste disposal sites, such minor disturbances will not generate asbestos emissions. Accordingly, the proposed amendment has been changed, and warning signs are not required if an inactive disposal site applies and properly maintains a covering of compacted non-asbestos-containing material at least 60 centimeters (ca. 2 feet) in depth, or at least 15 centimeters (ca. 6 inches) in depth with a cover of vegetation. The proposed amendment would have also required that active asbestos waste disposal sites post warning signs. The amendments promulgated herein do not apply directly to active disposal sites, and the specified operating practices for acceptable disposal sites do not require the posting of warning signs provided an appropriate cover of at least 15 centimeters (ca. 6 inches) of non-asbestos-containing material is applied to the active portion of the site at the end of each operating day. Comments were received that suggested the Agency should allow the use of existing natural barriers as substitutes for fences that are intended to deter access to some types of asbestos waste disposal sites. The Agency agrees that certain natural barriers, such as deep ravines and steep cliffs, can be as effective as fences in deterring access. The proposed amendment has been changed to suspend the requirements for fences, and also warning signs, when a natural barrier provides an adequate deterrent to public access. Upon request and supply of appropriate information, the Administrator will determine whether a specific type of fence or a natural barrier adequately deters access to the general public. In response to another comment, the proposed amendment for fencing of asbestos waste disposal sites has been revised to allow fences to be placed either along the property line of an affected source that contains a waste disposal site or along the perimeter of the disposal site itself. Either type of fence provides the necessary deterrent to public access to the disposal site.

Several comments were received on the proposed prohibition of incineration of containers that previously contained commercial asbestos. One commentator stated that the prohibition seemed undesirable because asbestos is thermally degraded at a temperature of 600° C. The Agency considered: (a) the uncertainty that the feed material to an incinerator will be uniformly heated to the combustion chamber temperature, (b) the uncertainty concerning the decomposition temperature of asbestos, and (c) the results of a stack gas test that detected emissions of asbestos from a sintering process in which the temperature attained was well above 600° C, in evaluating the comment. The Agency concluded that the available data do not justify changing the proposed regulation on grounds that the asbestos is thermally degraded in the combustion process. Another comment suggested that incineration should be permitted, provided there are no visible emissions of asbestos particulate matter from the incinerator. Information presented to the Agency after proposal indicated that some small incinerators, such as those operated by asbestos manufacturing plants, can be operated with no visible emissions. The proposed prohibition on incineration of containers that previously held commercial asbestos has been deleted. The provisions of the amendments for the disposal of asbestos-containing waste materials apply in particular to the disposal of containers that previously held commercial asbestos. Therefore, these containers can be incinerated under the amendments, provided the incineration operation does not discharge visible emissions.

Two commentators suggested that the proposed amendments should not require that EPA warning labels be attached to containers of asbestos waste in addition to the warning labels specified in regulations issued by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). The Agency agrees that both labels adequately convey the desired information; therefore, the proposed amendment has been changed to allow the OSHA warning label to be used in place of the EPA warning label.

Several commentators requested that the proposed alternative method of compliance included in the asbestos waste disposal amendments, which specified that the waste be formed into non-friable pellets, be changed to accommodate shapes other than pellets. The precise size and shape of the processed, non-friable waste is not important, and the amendment has been reworded to explicitly permit the forming of asbestos wastes into pellets or any other shapes.

A comment was made during review within the Agency that asbestos-containing wastes subject to the proposed amendment are sometimes used to surface roadways and that this practice should be prohibited. The Agency agrees that the use of asbestos-containing wastes on roadways can cause asbestos emissions similar to those caused by the use of asbestos tailings on roadways, which is prohibited by the asbestos standard. Vehicular traffic on roadways can pulverize asbestos waste and liberate fibers that can become airborne in the wake of moving vehicles and by the wind. The use of asbestos-containing wastes has therefore been prohibited from use on roadways.

The proposed amendment for waste disposal at asbestos mills included a provision requiring no visible emissions to the outside air from the deposition of asbestos ore tailings onto a disposal pile. An alternative method of compliance required that the waste be adequately wetted with a dust suppressant agent prior to deposition. Two commentators stated that an exemption from the wetting requirement of the alternative method is needed when the temperature at the disposal site is below freezing, to prevent freezing of the tailings and permit continued operation of the asbestos mill at such low temperatures. The investigation carried out by the Agency prior to proposal of the amendment indicated that wetting of asbestos tailings is the only presently available method for effectively controlling particulate emissions from the deposition operation. In response to the comments received, the Agency further investigated the cold weather operational problems of disposal systems for wetted asbestos tailings. Discussions were held with operators of three Canadian asbestos mills that frequently operate under cold weather conditions and have installed tailings wetting systems, with a firm that is experienced in designing systems to suppress dust generated by materials conveying operations, and with several non-asbestos mineral mining facilities that operate wetting systems for crushing and conveying operations. The investigation revealed that several Canadian asbestos mills are presently experimenting with wet tailings disposal systems to extend operation to temperatures substantially below freezing. However, the Agency is aware of no such system that has operated in a continuous manner at temperatures below −9.5°C (15°F). Accordingly, the Agency has concluded that wet tailings disposal systems for asbestos mills are not available for disposal site temperatures below −9.5°C (15°F), and the proposed amendment has been changed to provide an exemption for wetting of tailings below this temperature. Only one existing domestic asbestos mill is expected to use the exemption to a significant extent. An examination of hourly temperatures representative of the location of that plan, and extending over a period of one year, showed that hourly temperatures are below 15°F for approximately 7 percent of the time.

Asbestos emissions at asbestos mill tailings disposal piles are contributed by the tailing conveying operation, the deposition operation, and wind entrainment of asbestos-containing particulate from the surface of the disposal pile. The first emission source is subject to previously promulgated regulations (38 FR 8820), and the latter two sources are subject to the amendments promulgated herein. The major sources of asbestos emissions from process gas streams at asbestos mills, namely effluents from crushers, dryers and milling equipment, are also covered by the previously promulgated regulations (38 FR 8820). The amendments promulgated herein, including an exemption from wetting of asbestos tailings at temperatures below −9.5° C (15° F), together with the standards promulgated on April 6, 1973 (38 FR 8820), represent use of the best available technology for control of emissions from asbestos mills. This is consistent with the determination of the Administrator that best available technology should be used to control major sources of asbestos emissions to protect the public health with an ample margin of safety.

The reporting format of Appendix A has been changed by the addition of paragraphs "C" and "D", to accommodate the addition of disposal of asbestos-containing wastes and certain inactive asbestos waste disposal sites to the amendments. The additional information required is essential for determining compliance with the regulations. Appendix A has also been revised into a new computer format which will promote more effective enforcement of the regulations. Section 61.24 has been revised to reflect the additional reporting information requested in Appendix A.

ADDITIONAL COMMENTS

Manufacturing and Fabrication. One comment questioned the need for including asphalt concrete manufacturing plants in the proposed amendments. The rationale for including asphalt concrete plants as major sources of asbestos is discussed in the background information document for the proposed amendments (EPA-450/2-74-009a). Two commentators suggested that the manufacture of asphalt concrete containing less than 3 to 5 percent asbestos in the total mixture should be exempt from the regulations. However, asbestos asphalt concrete typically contains 1 to 2 percent asbestos, and the Agency determined that asbestos asphalt concrete operations using even these low percentages of asbestos are major sources. No data or information were received that would indicate asphalt concrete plants are not major sources, and the regulations promulgated herein apply to such sources. The Agency received two comments that the individual emission sources within an asbestos asphalt concrete plant which are subject to the proposed amendments should be specified. The Agency feels that revisions are not necessary. Only component operations that may emit asbestos are covered by the provisions; for example, if no asbestos is added to the aggregate dryer, the emissions from the dryer alone are not covered.

The possibility that the enforcement of the amendments promulgated herein for asphalt concrete plants may be in conflict with the enforcement of new source performance standards for asphalt concrete plants was raised by one commentator. It is possible that both the new source performance standard and the national emission standard for asbestos will apply simultaneously to emissions from some operations at some new and modified plants. Where this occurs, the visible emission standard promulgated herein applies to asbestos particulate matter, even though it is more restrictive than the opacity regulation of the new source performance standard. A more stringent standard is justified when asbestos is being processed because of the hazardous nature of asbestos.

Comments were received that the proposed definition of "fabricating" needed to be clarified. The Agency reviewed the definition and determined that changes in the definition are not necessary. Fabricating includes any type of processing, excluding field fabrication, performed on manufactured products that contain commercial asbestos. The Agency acknowledges that some component processes of asbestos fabricating operations could generate visible emissions in such a manner that the visible emissions do not contain asbestos generated by the process, though the commentators did not cite any specific examples. The Agency has observed this type of process in asbestos manufacturing operations. For example, visible emissions of organic materials are sometimes generated during the curing of asbestos friction products in operations where asbestos is bound into a matrix of non-asbestos material but the asbestos is not transferred into the emission stream. Such operations are in compliance with the standard of no visible emissions containing particulate asbestos material.

One commentator stated that some field fabrication operations release significant amounts of asbestos. The Agency's investigation prior to proposal of the amendments showed that there is only limited field fabrication of asbestos products other than insulating products. The fabrication of friable asbestos insulation was determined to be the only major asbestos field fabrication source, and this is regulated by prohibiting the use of such materials after the effective date of the amendments promulgated herein. In the judgment of the Administrator, the comment did not contain sufficient information to justify including other categories of asbestos field fabrication in the amendments. One commentator recommended that the Agency impose a standard of 0.03 grain per cubic foot for asbestos emissions in addition to the no-visible-emission standard. It is the judgment of the Agency that there are no sufficiently reliable emision measurement techniques to provide a basis for such a numerical standard and the setting of numerical standards should be delayed until accurate asbestos measuring techniques are available.

Demolition and Renovation. Comments were received which suggested that the proposed renovation provisions should not apply to operations carried out within buildings, or to operations regulated by the Occupational Safety and Health Administartion (OSHA) for worker exposure to asbestos. The Agency recognizes that there may be less asbestos emissions from stripping of friable asbestos materials within a structure than from stripping in an unenclosed area. However, asbestos from the stripping operation carried out within a building or structure can be discharged into the outside air from building ventilation systems, windows and doors. Further, the disposal of friable asbestos waste materials generated by renovation operations, which includes the transport of waste materials to a disposal site, is an emission source that needs to be controlled regardless of whether the renovation is performed in the outside air or in buildings. In the judgment of the Administrator, the control of such asbestos emissions is necessary and is part of the best available control technology. The OSHA regulations (29 CFR 1910.93a) require that, ". . . insofar as practicable . . .," asbestos material be removed while wetted effectively to prevent emission of asbestos in excess of the specified OSHA exposure limit, but also specifically require that employees shall be provided with respiratory equipment for all spraying, demolition and removal of asbestos materials. The purpose of the OSHA standard, to protect employees' health, can be achieved by the use of respiratory equipment, even in those situations where wetting is not implemented and emissions may produce concentrations in excess of the OSHA exposure limit. The extent to which the resulting concentrations in the outside air are protective of public health is unknown. Accordingly, the proposed renovating provisions do not exempt operations that are controlled by OSHA regulations.

Two commentators stated that the alternative to the wetting requirement in the demolition provisions at sub-freezing temperatures should be allowed at all temperatures. In contrast, another commentator suggested that suspension of the wetting requirements at sub-freezing temperatures should be subject to a permit procedure that would discourage demolition at sub-freezing temperatures. The alternative was proposed because, in the judgment of the Agency, worker safety would be unduly jeopardized by the unsafe footing caused by ice formation from water use under freezing conditions. The proposed alternative is less restrictive on demolition contractors than a second course of action that was considered, namely the prohibition of demolition under freezing conditions. The proposed alternative suspends only a portion of the wetting requirements under freezing conditions. Pipes, ducts, boilers, tanks, reactors, turbines, furnaces and structural members insulated or fireproofed with friable asbestos materials must be removed from the building in sections, to the maximum extent practicable, before wrecking of the building. The stripping of asbestos materials from the previously removed sections must be accompanied by wetting at all temperatures, and the resulting asbestos waste materials must be wetted at all temperatures. These procedures do not jeopardize worker safety. Therefore, the promulgated demolition provisions are based on the use of the best available emission control methods at all temperatures, and these methods are different for non-freezing and freezing conditions.

Another comment indicated that sprayed fireproofing was the only type of asbestos material that could cause asbestos emissions to the atmosphere during demolition operations, and that molded insulation is not readily released into the air. The Agency has inspected both types of materials and has found that some types of molded insulation and plaster that contain asbestos are friable. Therefore, buildings containing these materials are covered by the amendments promulgated herein.

Comments were received that the Agency has a responsibility to develop asbestos measurement methods and determine by use of measurement methods whether demolition is a major source of asbestos emissions. The Agency keeps abreast of newly developed measurement techniques in the asbestos industry, and the development of asbestos measurement techniques is currently being funded by the Agency. No new information on measurement techniques was received in the comments. The Agency previously made the determination that building demolition is a major source of asbestos emissions, and no new information has been submitted to demonstrate that it is not a major source. Demolition and renovation operations generate short-term exposures of urban populations to asbestos. Since promulgation of the demolition regulations on April 6, 1973, new biological evidence supporting the significance of single short-term exposures of asbestos has been obtained. One-day inhalation exposures in animal experiments have produced an increase in the incidence of mesothelioma. (Wagner, J. C., Berry, G., and Timbrell, V., "The Effects of the Inhalation of Asbestos in Rats", *Br. J. Cancer 29*, pp. 252–269, 1974). A copy of this article is available for inspection at the Public Information Reference Center, Room 2404, Waterside Mall, 401 M Street, SW, Washington, D.C. 20460. It can be concluded that human asbestos exposure for periods typically required to perform demolition and renovation operations is hazardous. Therefore, the Agency has not changed its prior determination that building demolition is a major source of asbestos emissions. Another commentator was concerned that the demolition sources now covered by the asbestos standard as major sources were not defined as major sources by the National Academy of Sciences (NAS) study, which was cited by the Agency as a basis for the demolition regulation. The NAS study did not define categories of asbestos materials other than sprayed fireproofing as major emission sources because data were available at that time on fireproofing only. The Agency had concluded prior to proposing asbestos standards on December 7, 1971 that any friable asbestos material used for insulation or fireproofing has a comparable potential to create asbestos emissions upon demolition or renovation as sprayed fireproofing, and therefore these materials are also covered by the regulations.

Several comments were received stating that the definitions of "friable asbestos material," "asbestos," and "asbestos material" are vague and subjective and remain constitutionally deficient for a regulation enforceable by criminal proceedings. The Agency reevaluated the definitions and concluded that they are sufficiently clear that the owners or operators subject to the amendments can reasonably be expected to understand these terms. Owners or operators should be able to identify covered material and comply with the regulations on the basis of the definitions supplied.

Comments were made suggesting the Agency describe more specifically a proper wetting operation. The purpose of the wetting requirements is to reduce the amount of asbestos dust generated during demolition operations. Many different procedures would accomplish this; therefore, the Agency believes that specifying such procedures is neither necessary nor appropriate. A new definition of "adequately wetted" was added to the regulations promulgated herein. The Agency believes that owners or operators of demolition operations are familiar with proper wetting procedures.

Two comments were made stating that the proposed demolition and renovation amendments are not emission standards and that asbestos emissions must be proved in determining compliance with the regulations. Congress has specified that EPA should set emission standards for hazardous air pollutants. EPA, charged with implementing this requirement, has determined that the term "emission standard" includes work practice requirements designed to limit emissions. The position taken by the Administrator on this issue in the promulgation of the original regulations on asbestos on April 6, 1973 (38 FR 8820) is unchanged here. The demolition and renovation regulations require certain work procedures to be followed. These methods of control are required because of the impossibility at this time of prescribing and enforcing allowable numerical concentrations or mass emission limitations. One difficulty in prescribing a numerical emission standard is the relative inaccuracy of asbestos analytical methods. Dr. Arnold Brown, testifying in a recent court case involving asbestos emissions [*United States et al.* v. *Reserve Mining Co. et al.*, 498 F.2d 1073, 1079, (8th Cir., 1974)] stated, "It is reasonable to assume an error in the count of fibers in both water and air of at least nine times op the high side to one-ninth on the low side." Further testifying on the same subject, Dr. Brown stated, ". . . I do not recall having been exposed to a procedure with an error this large, and which people have seriously proposed a number based on this very poor procedure." Moreover, there is no place to measure the total emissions from a demolition or renovation operation. The Agency has determined that violations of the work practices specified in the demolition section will result in emissions of asbestos. Considering these facts, the prescription of work practices is not only a legally permissible form of an emission standard, but also the only practical and reasonable form.

Waste Disposal. A number of commentators questioned the relationship between the proposed no-visible-emissions requirements in the proposed asbestos waste disposal provisions and the alternative methods for complying with the requirement. The following points were included in the comments:

1. Can any of a variety of waste disposal methods be used to meet the no-visible-emissions limit?
2. Various other methods of disposal should be specified as alternatives.
3. The inclusion of a no-visible-emissions requirement in portions of the alternative methods of compliance is a paradox.
4. Various alternatives are either not feasible or are unnecessary for some specific waste disposal operations.

As stated in §§ 61.22 (j) and (k) of the proposed and promulgated amendments, a requirement for affected sources that dispose of asbestos waste is no visible emissions during waste disposal operations. This provides affected sources flexibility in developing and using those disposal techniques most suitable to individual needs. The Agency recognizes that the best available disposal methods for some of the sources may not be capable of preventing visible emissions during a minor portion of some of the disposal operations. Therefore, alternative methods of compliance that represent the best available disposal methods have been included in the regulations. Sources are not required to use these methods; they may use other methods that achieve no visible emissions. However, sources may elect to use one of the specified alternatives. Some of these alternatives result in no visible emissions; others may not. For those alternative methods that may not be capable of preventing visible emissions during all portions of the waste disposal process, a requirement has nevertheless been included that there be no visible emissions from those portions of the process that can achieve this performance level. The listing of a particular method of waste disposal as an alternative method of compliance does not imply that the method is universally applicable or that the use of the method is necessary to achieve no visible emissions.

Some comments questioned whether the proposed amendments would apply to asbestos waste disposal sites that were inactivated prior to the publication of the proposed amendments. Regulations established under section 112 of the Act are applicable to both existing sources and new sources. The amendments cover previously inactivated sites as well as sites that become inactive in the future. However, the proposed amendments have been revised as discussed in "Changes to the Proposed Amendments" so that only owners of sites which have been operated by asbestos mills, manufacturing plants, and fabricating plants subject to the asbestos standard must comply with the asbestos amendments proposed herein for inactive asbestos waste disposal sites.

Several commentators suggested that certain types of asbestos waste disposal sites should be excluded from the proposed amendments, depending upon the the rate at which asbestos waste is deposited at the site, the percentage of the total waste that is asbestos, the friability of the asbestos waste, and the extent to which the site is in active operation. These comments were considered, but no changes in the proposed amendments were made as a result of the Agency's reevaluation. It would be extremely difficult to enforce regulations that depend on the rate or asbestos content of waste deposition. Further, the provisions promulgated herein shift the focus of the waste disposal requirements away from the site operator to the generator of the waste. Because of this, the burden of the requirements on a waste disposal site operator who accepts only a very small quantity of asbestos waste, and who the commentators desire to exclude from the regulations, is largely removed.

A comment was made that the proposed amendments could cause considerable hardship to small users of asbestos because some waste disposal sites may no longer accept asbestos wastes. There are an estimated 5,000 waste disposal sites in the U.S. which meet the standards of a sanitary landfill. A properly operated sanitary landfill complies with the soil-covering requirements of the amendments, and therefore will be affected only slightly by handling asbestos wastes. Accordingly, the Agency believes that small manufacturers and users of asbestos will not encounter severe problems in complying with the amendments for waste disposal sites.

Two commentators were concerned that the proposed waste disposal provisions would cause serious problems in contract hauling arrangements; and in the use of private landfills, municipal landfills, and waste disposal sites leased by generators of the asbestos waste. Since the generator of the waste has the direct responsibility for compliance during the transport of waste and for disposing of the waste at a properly operated disposal site, the Agency believes that problems in contract hauling arrangements can be avoided if the generator institutes proper waste handling practices. The Agency also believes that the deletion in the promulgated amendments of some of the proposed requirements for posting of warning signs will remove many of the potential problems that were of concern. Further changes to the proposed amendments were judged unnecessary because they impose few additional requirements on disposal sites, such as municipal sanitary landfill sites, that are properly operated.

A comment suggested that bags which previously held commercial asbestos should be exempt if the bags have been cleaned sufficiently so that shaking the bags will not generate visible emissions of asbestos particulate matter. Even if such wastes do not produce visible emissions during the subsequent processing, transporting and depositing operations at a waste disposal site, there is a need for ensuring proper ultimate waste disposal because such bags still are likely to contain residual asbestos. The Agency believes that regulations are needed for this purpose and also for the purpose of ensuring that emissions from the cited method of cleaning bags are properly controlled. Accordingly, the disposal of bags that have been cleaned in the manner described has not been exempted from the amendments promulgated herein.

Comments were received which stated that the proposed waste disposal provisions would probably preclude the disposal of waste asbestos cement pipe in commercial landfills. It is the Agency's judgment that commercial landfills which comply with the regulations will be available. Further, the pipe crushing operation that is conventionally carried out during compaction at the disposal site can alternatively be performed and controlled by gas cleaning equipment at a stationary crusher.

MERCURY

CHANGES TO PROPOSED AMENDMENTS

The proposed definition of "sludge dryer" has been revised to indicate more clearly that only sludge drying operations that are directly heated by combustion gases are covered by the amendment. The amendment does not apply to devices that are indirectly heated, such as secondary mercury recovery furnaces.

A comment suggested that daily sludge sampling and analysis should be required to reveal potential variations in mercury content of the sludge. The daily averages of sludge mercury content are not expected to vary significantly, and the Agency believes that the added cost to the owners or operators of such sources for daily sampling and analysis of sludge is not justified. Variations in mercury concentration of sludge can occur over longer periods of time, however, and a requirement has been added that all facilities for which emissions are in excess of 1600 grams per day as determined by the initial compliance test must monitor on a yearly basis with the sludge sampling method. In addition, the Agency has authority to request sludge sampling and analysis, or stack sampling, and will exercise this authority whenever there are indications that a change in mercury concentration of the sludge has occurred that would significantly increase mercury emissions.

One commentator suggested several revisions to procedures in the proposed sludge testing method, Method 105. The procedures were reevaluated, and the method has been changed where appropriate. The proposed section 3.1.3 of Method 105 specified a 10 percent solution of stannous chloride as an alternative to stannous sulfate. One comment stated that it was inappropriate to require any solution percentage. The Agency agrees, and the requirement has been deleted. Another comment suggested that the required use of mercuric chloride of Bureau of Standards purity to prepare the mercury stock solution is not necessary because the precision of the method does not demand such purity. The Agency agrees with this comment, and the method has been changed to permit the use of reagent grade mercuric chloride. The comment was made that mercuric solutions should not be prepared in plastic containers. The Agency is in general agreement with this and a statement to this effect has been added to Method 105. Section 4.1.1 of the method specifies that the, ". . . sampling devices, glassware and reagents should be ascertained free of significant amounts of mercury." A major source of mercury contamination occurs when sample solutions and reagents come into contact with mercury-contaminated containers. A comment indicated that a specific quantity should be stated to indicate how much mercury is considered "significant." The Agency believes that the specification of an amount of mercury contamination is inappropriate because such an amount would be very difficult to measure. The mercury contamination of containers can be reduced to an insignificant amount by properly cleaning such containers before use. The proposed paragraph has therefore been changed to specify that sample containers shall be properly cleaned before use by rinsing with nitric acid, followed by rinsing with distilled water. Another comment suggested that the possible interferences with the analysis of mercury in sludge should be delineated and that preventative measures should be given. In response, two references in which such interferences are discussed have been added to Method 105.

ADDITIONAL COMMENTS

The Agency has determined that an ambient air mercury concentration of 1 microgram per cubic meter averaged over a 30-day period will protect the public health with an ample margin of safety. The maximum allowable mercury emission for sludge incineration and drying plants was calculated, by use of meteorological modeling techniques using restrictive dispersion conditions, that would not result in this ambient concentration being exceeded. The resulting maximum allowable emission is 3200 grams of mercury per day. Numerous comments were received that questioned the methodology used to calculate this emission limitation. Several comments questioned the derivation of the ambient concentration of 1 microgram per cubic meter, 30-day average, and indicated that this level should be lower. The Agency evaluated these comments, but determined that no new information had been presented that had not been previously considered in the derivation of this allowable concentration. Another commentator stated that the restrictive meteorological conditions used for sewage sludge incineration and drying plants do not represent the "worst case" meteorological conditions, and discussed a specific existing facility as an example. The Agency analyzed this comment considering the meterological conditions and topography at the specific site mentioned in the comment and concluded that, even with a mercury emission of 3200 grams per day, the public will be protected with an ample margin of safety at the cited facility. A copy of the Agency response to this comment is available for inspection at the Public Information Reference Center, Room 2404 Waterside Mall, 401 M St., Wash., D.C. 20460. The Agency knows of no sludge incineration or drying facility where the ambient guideline level of one microgram of mercury per cubic meter, 30-day average, will be exceeded. The following comments stating that the proposed emission limit is too stringent or that additional studies are needed before promulgation were received:

1. The proposed emission limit provides an excessive safety factor for some plant locations.
2. The proposed emission limit should be based on plant size, allowing larger emissions for larger plants.
3. The intent of the proposed amendment seems to be to limit the size of new plants and require disposal of sludge by alternative methods.
4. The regulation seems to be excessively stringent in order to simplify the administration of the standard for multiple sources.
5. There is not enough information to justify promulgating the amendment at this time; the promulgation should be delayed until further studies are made.

In contrast, several comments suggested that the proposed emission limit was too lenient. Since the emission limitation is related to an ambient concentration, it would be inappropriate to allow higher emissions for larger plants. Concerning plant location, it would be impractical to specify a different emission limitation for each present or future plant location which reflected local meteorological conditions. Moreover, section 112 of the Act provides for a national standard, and the Administrator has set this standard at a level which will prevent exceeding the specified safe ambient level at all locations. The Agency determined that there is sufficient information to justify promulgating emission regulations for sludge incinerators and no data or information were presented that would justify changing the mercury emission limit of 3200 grams per day.

A comment was made that the impact of multiple sources of mercury emissions was not addressed in the derivation of the national emission standard for mercury. While the standard does not include special provisions for multiple sources, it does provide a large safety factor at many sites and this provides a measure of protection against the multiple source problem. The Agency knows of no location where existing multiple sources of mercury will cause the ambient guideline level of one microgram of mercury per cubic meter, 30-day average, to be exceeded. The Agency must approve all new construction or modification of sources regulated by the mercury standard. During the review of such construction or modification, the Agency will assess the impact that the new or modified sources have on the ambient mercury concentration. If the Agency discovers a situation where a source can cause the guideline ambient concentration to be exceeded, the national emission standard will be reevaluated. In addition, local planning agencies have the capability to prevent multiple source pollution problems through proper land use planning. The Agency urges these local agencies to consider the impact of multiple sources on such problems as mercury air pollution when making planning decisions.

Comments were received that questioned whether all sludge incineration and drying plants are major sources of mercury emissions that must demonstrate compliance with the standard. All of these facilities have the potential to emit mercury; the amount of mercury that is emitted depends upon the mercury content of the sludge and the sludge incineration or drying rate. Accordingly, all such facilities must demonstrate compliance with the emission limitation promulgated herein.

A comment was received that the economic impact of the proposed amendments on some large facilities may be large, since there may be few or no alternatives for sludge disposal. The Agency estimates that the largest mercury emission from an existing sludge incinerator or dryer is approximately 500 grams per day, which is approximately one-sixth of the maximum allowable emission. The time period over which sludge generation would increase in excess of six-fold should provide sufficient lead time for planning an economically feasible alternate disposal method, if it is required. The Agency therefore does not foresee a significant economic impact for the near future at any sludge incineration or drying plant.

Several comments stated that other sources such as ore processing plants, mercury compound manufacturing plants, industrial waste incinerators, coal-fired power plants, and rooms painted with mercury-containing paints should be investigated and regulated if necessary. The Agency previously investigated mercury emissions from nonferrous smelting plants, secondary mercury production plants, coal-fired power plants, and solid waste incineration plants, and determined that these sources do not emit mercury in such quantities that they are likely to cause the ambient mercury concentration to exceed one microgram per cubic meter. The Agency has regulated all sources that may reasonably be expected to cause an ambient mercury concentration of as much as one microgram per cubic meter, 30-day average. However, the Agency will continue a policy of investigating any source of mercury that it has reason to believe has the potential to endanger the public health.

Another comment stated that the Agency should give specific suggestions, or references should be provided, for disposing of mercury-containing sludges on land in a manner that would protect water resources. The Agency's Office of Water and Hazardous Materials is preparing technical publications on various alternatives for the disposal of sludges, and such materials should be available in the near future.

Several comments were made on the mercury collection efficiency of water scrubbers. One commentator suggested that the mercury collection efficiency of individual water scrubbers should be assumed to be zero for purposes of determining compliance, until positively proven otherwise. Another commentator stated that the proposed sludge sampling method should take into account the amount of mercury that would be collected by a scrubber. The Agency has determined that the requirements of the standard are adequate. No credit for mercury removed by water scrubbers is allowed when compliance is determined by sludge sampling and analysis; however, if the mercury stack measurement method is used to determine compliance, only the amount of mercury emitted to the outside air is measured and any mercury collection by the system is taken into account. The Agency has determined that sludge sampling and analysis can be used as an alternative method to determine maximum mercury emissions, because it is sufficiently accurate. The method is also inexpensive when compared to a complete stack test.

The following comments were received which suggested changes to Method 105 for sludge sampling:

1. A 5 percent potassium permanganate solution is difficult to prepare, and a saturated solution should be required.

2. Potassium permanganate should be used to stabilize mercury solutions.

3. Hydroxylamine hydrochloride can be used in place of the uncommon salt sodium chloride-hydroxylamine sulfate to reduce excess potassium permanganate.

Solutions of 5 percent potassium permanganate can be prepared at room temperature. The Agency has no experience in using potassium permanganate to stabilize mercury solutions, and has not used hydroxylamine hydrochloride to reduce excess potassium permanganate. The method has proved to be satisfactory without the use of the suggested reagents. The Agency believes that the suggested changes are not necessary and the method has not been revised to accommodate these suggestions.

ENVIRONMENTAL AND ENERGY IMPACT

Environmental impact statements must accompany national emission standards for hazardous air pollutants approved for proposal after October 14, 1974. The amendments recommended for promulgation were approved for proposal prior to this date, and an environmental impact statement has not been prepared. The environmental impact of the standards has been assessed, however, and is discussed in the background information document (EPA-450/2-74-009a) for the proposed standards and in the preamble (39 FR 38064) to the proposed standards.

The energy impact resulting from the control of asbestos waste disposal operations at asbestos emission sources and at waste disposal sites is expected to be insignificant since this waste is already collected and deposited at waste disposal sites. Only a relatively small quantity of additional waste material is generated as a result of better control of particulate emissions from manufacturing and fabrication sources covered by the standard. The major energy impact of the amendments is that resulting from the operation of fabric filtration devices at manufacturing and fabrication plants. It is estimated that approximately 170 baghouses of 1000 acfm capacity will be required to comply with the amendments. The operation of these control devices will require the consumption of 2.5 million kilowatt hours per year, which is equivalent to 3900 barrels per year of Number 6 fuel oil at the power generating station. The energy impact resulting from the NESHAPS amendment is small and is justified by the increased control of asbestos emissions.

There is no energy impact that results from the regulation of mercury emissions from sludge incinerators and dryers.

Effective upon promulgation.

(Sec. 112 and 114 of the Clean Air Act, as amended (42 U.S.C. 1857c–7 and 9))

Dated: October 3, 1975.

JOHN QUARLES,
Acting Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. The table of sections is amended as follows:

Subpart A—General Provisions

Sec.

* * * * *

61.17 Circumvention.

* * * * *

Subpart B—National Emission Standard for Asbestos

* * * * *

61.25 Waste disposal sites.

* * * * *

Subpart E—National Emission Standard for Mercury

* * * * *

61.54 Sludge sampling.
61.55 Emission monitoring.

* * * * *

Appendix B—Test Methods

* * * * *

Method 105—Method for determination of mercury in wastewater treatment plant sewage sludges.

2. The authority citation at the end of the table of sections for Part 61 is revised to read as follows:

AUTHORITY: Secs. 112 and 114 of the Clean Air Act, as amended by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1678 (42 U.S.C. 1857c-7, 1857c-9).

Subpart A—General Provisions

3. Section 61.14 is amended by revising paragraph (c) and adding paragraph (d). The revised and added paragraphs read as follows:

§ 61.14 Source test and analytical methods.

* * * * *

(c) The Administrator may, after notice to the owner or operator, withdraw approval of an alternative method granted under paragraphs (a), (b) or (d) of this section. Where the test results using an alternative method do not adequately indicate whether a source is in compliance with a standard, the Administrator may require the use of the reference method or its equivalent.

(d) Method 105 in Appendix B to this part is hereby approved by the Administrator as an alternative method for sources subject to § 61.52(b).

4. A new § 61.17 is added to subpart A as follows:

§ 61.17 Circumvention.

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment, process, or method, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous dilutants to achieve compliance with a visible emissions standard, and the piecemeal carrying out of an operation to avoid coverage by a standard that applies only to operations larger than a specified size.

Subpart B—National Emission Standard for Asbestos

5. Section 61.21 is amended by revising paragraph (j) and adding paragraphs (k), (l), (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), and (w). The revised and added paragraphs read as follows:

§ 61.21 Definitions.

* * * * *

(j) "Demolition" means the wrecking or taking out of any load-supporting structural member and any related removing or stripping of friable asbestos materials.

(k) "Friable asbestos material" means any material that contains more than 1 percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure.

(l) "Control device asbestos waste" means any asbestos-containing waste material that is collected in a pollution control device.

(m) "Renovation" means the removing or stripping of friable asbestos material used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.

(n) "Planned renovation" means a renovation operation, or a number of such operations, in which the amount of friable asbestos material that will be removed or stripped within a given period of time can be predicted. Operations that are individually non-scheduled are included, provided a number of such operations can be predicted to occur during a given period of time based on operating experience.

(o) "Emergency renovation" means a renovation operation that results from a sudden, unexpected event, and is not a planned renovation. Operations necessitated by non-routine failures of equipment are included.

(p) "Adequately wetted" means sufficiently mixed or coated with water or an aqueous solution to prevent dust emissions.

(q) "Removing" means taking out friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation.

(r) "Stripping" means taking off friable asbestos materials used for insulation or fireproofing from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.

(s) "Fabricating" means any processing of a manufactured product containing commercial asbestos, with the exception of processing at temporary sites for the construction or restoration of buildings, structures, facilities or installations.

(t) "Inactive waste disposal site" means any disposal site or portion thereof where additional asbestos-containing waste material will not be deposited and where the surface is not disturbed by vehicular traffic.

(u) "Active waste disposal site" means any disposal site other than an inactive site.

(v) "Roadways" means surfaces on which motor vehicles travel including, but not limited to, highways, roads, streets, parking areas, and driveways.

(w) "Asbestos-containing waste material" means any waste which contains commercial asbestos and is generated by a source subject to the provisions of this subpart, including asbestos mill tailings, control device asbestos waste, friable asbestos waste material, and bags or containers that previously contained commercial asbestos.

6. Section 61.22 is amended by amending paragraphs (c) and (e), revising paragraphs (b), (d), (f), and (g) and adding paragraphs (h), (i), (j), (k), and (l). The revised and added paragraphs read as follows:

§ 61.22 Emission standard.

* * * * *

(b) Roadways: The surfacing of roadways with asbestos tailings or with asbestos-containing waste that is generated by any source subject to paragraphs (c), (d), (e) or (h) of this section is prohibited, except for temporary roadways on an area of asbestos ore deposits. The deposition of asbestos tailings or asbestos-containing waste on roadways covered with snow or ice is considered "surfacing."

(c) Manufacturing: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

* * * * *

(10) The manufacture of shotgun shells.

(11) The manufacture of asphalt concrete.

(d) Demolition and renovation: The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is insulated or fireproofed with friable asbestos material, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca. 260 feet) of pipe insulated or fireproofed with friable asbestos material are stripped or removed, or more than 15 square meters (ca. 160 square feet) of friable asbestos material used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed.

(1)(i) The owner or operator of a demolition operation is exempted from the requirements of this paragraph provided, (1) the amount of friable asbestos material in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used to insulate pipes, and less than 15 square meters (ca. 160 square feet) used to insulate or fireproof any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (2) the notification requirements of paragraph (d)(1)(ii) are met.

(ii) Written notification shall be postmarked or delivered to the Administrator at least 20 days prior to commencement of demolition and shall include the information required by paragraph (d)(2) of this section, with the exception of the information required by paragraphs (d)(2)(iii), (vi), (vii), (viii), and (ix), and shall state the measured or estimated amount of friable asbestos material used for insulation and fireproofing which is present. Techniques of estimation shall be explained.

(2) Written notice of intention to demolish or renovate shall be provided to the Administrator by the owner or operator of the demolition or renovation operation. Such notice shall be postmarked or delivered to the Administrator at least 10 days prior to commencement of demo-

lition, or as early as possible prior to commencement of emergency demolition subject to paragraph (d)(6) of this section, and as early as possible prior to commencement of renovation. Such notice shall include the following information:

(i) Name of owner or operator.

(ii) Address of owner or operator.

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos material used for insulation and fireproofing.

(iv) Address or location of the building, structure, facility, or installation.

(v) Scheduled starting and completion dates of demolition or renovation.

(vi) Nature of planned demolition or renovation and method(s) to be employed.

(vii) Procedures to be employed to meet the requirements of this paragraph and paragraph (j) of this section.

(viii) The name and address or location of the waste disposal site where the friable asbestos waste will be deposited.

(ix) Name, title, and authority of the State or local governmental representative who has ordered a demolition which is subject to paragraph (d)(6) of this section.

(3)(i) For purposes of determining whether a planned renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be:

(A) For planned renovating operations involving individually non-scheduled operations, the additive amount of friable asbestos material that can be predicted will be removed or stripped at a source over the maximum period of time for which a prediction can be made. The period shall be not less than 30 days and not longer than one year.

(B) For each planned renovating operation not covered by paragraph (d)(3)(i)(A), the total amount of friable asbestos material that can be predicted will be removed or stripped at a source.

(ii) For purposes of determining whether an emergency renovating operation constitutes a renovation within the meaning of this paragraph, the amount of friable asbestos material to be removed or stripped shall be the total amount of friable asbestos material that will be removed or stripped as a result of the sudden, unexpected event that necessitated the renovation.

(4) The following procedures shall be used to prevent emissions of particulate asbestos material to outside air:

(i) Friable asbestos materials, used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used for insulation or fireproofing of any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such material shall be adequately wetted whenever exposed during demolition.

(ii) Friable asbestos materials used to insulate or fireproof pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d)(4)(iv), (d)(4)(vi) or (d)(4)(vii) of this section.

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are insulated or fireproofed with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjointing are adequately wetted during the cutting or disjointing operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used to insulate or fireproof any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

(v) All friable asbestos materials that have been removed or stripped shall be adequately wetted to ensure that such materials remain wet during all remaining stages of demolition or renovation and related handling operations. Such materials shall not be dropped or thrown to the ground or a lower floor. Such materials that have been removed or stripped more than 50 feet above ground level, except those materials removed as units or in sections, shall be transported to the ground via dust-tight chutes or containers.

(vi) Except as specified below, the wetting requirements of this paragraph are suspended when the temperature at the point of wetting is below 0°C (32°F). When friable asbestos materials are not wetted due to freezing temperatures, such materials on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall, to the maximum extent possible, be removed as units or in sections prior to wrecking. In no case shall the requirements of paragraphs (d)(4)(iv) or (d)(4)(v) be suspended due to freezing temperatures.

(vii) For renovation operations, local exhaust ventilation and collection systems may be used, instead of wetting as specified in paragraph (d)(4)(ii), to prevent emissions of particulate asbestos material to outside air when damage to equipment resulting from the wetting would be unavoidable. Upon request and supply of adequate information, the Administrator will determine whether damage to equipment resulting from wetting to comply with the provisions of this paragraph would be unavoidable. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping and removal of friable asbestos material. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems, except as provided in paragraph (f) of this section.

(5) Sources subject to this paragraph are exempt from the requirements of §§ 61.05(a), 61.07, and 61.09.

(6) The demolition of a building, structure, facility, or installation, pursuant to an order of an authorized representative of a State or local governmental agency, issued because that building is structurally unsound and in danger of imminent collapse is exempt from all but the following requirements of paragraph (d) of this section:

(i) The notification requirements specified by paragraph (d)(2) of this section;

(ii) The requirements on stripping of friable asbestos materials from previously removed units or sections as specified in paragraph (d)(4)(iv) of this section;

(iii) The wetting, as specified by paragraph (d)(4)(v) of this section, of friable asbestos materials that have been removed or stripped;

(iv) The portion of the structure being demolished that contains friable asbestos materials shall be adequately wetted during the wrecking operation.

(e) * * *

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis to insulate or fireproof equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information:

* * *

(f) Rather than meet the no-visible-emission requirements as specified by paragraphs (a), (c), (d), (e), (h), (j), and (k) of this section, an owner or operator may elect to use the methods specified by § 61.23 to clean emissions containing particulate asbestos material before such emissions escape to, or are vented to, the outside air.

(g) Where the presence of uncombined water is the sole reason for failure to meet the no-visible-emission requirement of paragraphs (a), (c), (d), (e), (h), (j), or (k) of this section, such failure shall not be a violation of such emission requirements.

(h) Fabricating: There shall be no visible emissions to the outside air, except as provided in paragraph (f) of this section, from any of the following operations if they use commercial asbestos or from any building or structure in which such operations are conducted.

(1) The fabrication of cement building products.

(2) The fabrication of friction products, except those operations that primarily install asbestos friction materials on motor vehicles.

(3) The fabrication of cement or silicate board for ventilation hoods; ovens; electrical panels; laboratory furniture; bulkheads, partitions and ceilings for marine construction; and flow control devices for the molten metal industry.

(i) Insulating: Molded insulating materials which are friable and wet-applied insulating materials which are friable after drying, installed after the effective date of these regulations, shall contain no commercial asbestos. The provisions of this paragraph do not apply to insulating materials which are spray applied; such materials are regulated under § 61.22(e).

(j) Waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations: The owner or operator of any source covered under the provisions of paragraphs (c), (d), (e), or (h) of this section shall meet the following standards:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (j)(3) of this section, during the collection; processing, including incineration; packaging; transporting; or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (j)(1) of this section, an owner or operator may elect to use either of the disposal methods specified under (j)(3)(i) and (ii) of this section, or an alternative disposal method which has received prior approval by the Administrator:

(i) Treatment of asbestos-containing waste material with water:

(A) Control device asbestos waste shall be thoroughly mixed with water into a slurry and other asbestos-containing waste material shall be adequately wetted. There shall be no visible emissions to the outside air from the collection, mixing and wetting operations, except as provided in paragraph (f) of this section.

(B) After wetting, all asbestos-containing waste material shall be sealed into leak-tight containers while wet, and such containers shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(C) The containers specified under paragraph (j)(3)(i)(B) of this section shall be labeled with a warning label that states:

CAUTION

Contains Asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous
to Your Health

Alternatively, warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.93a(g)(2)(ii) may be used.

(ii) Processing of asbestos-containing waste material into non-friable forms:

(A) All asbestos-containing waste material shall be formed into non-friable pellets or other shapes and deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(B) There shall be no visible emissions to the outside air from the collection and processing of asbestos-containing waste material, except as specified in paragraph (f) of this section.

(4) For the purposes of this paragraph (j), the term all asbestos-containing waste material as applied to demolition and renovation operations covered by paragraph (d) of this section includes only friable asbestos waste and control device asbestos waste.

(k) Waste disposal for asbestos mills: The owner or operator of any source covered under the provisions of paragraph (a) of this section shall meet the following standard:

(1) There shall be no visible emissions to the outside air, except as provided in paragraph (k)(3) of this section, during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material which is generated by such source.

(2) All asbestos-containing waste material shall be deposited at waste disposal sites which are operated in accordance with the provisions of § 61.25.

(3) Rather than meet the requirement of paragraph (k)(1) of this section, an owner or operator may elect to meet the following requirements in paragraphs (k)(3)(i) and (ii), or use an alternative disposal method which has received prior approval by the Administrator:

(i) There shall be no visible emissions to the outside air from the transfer of control device asbestos waste to the tailings conveyor, except as provided in paragraph (f) of this section. Such waste shall be subsequently processed either as specified in paragraph (k)(3)(ii) of this section or as specified in paragraph (j)(3) of this section.

(ii) All asbestos-containing waste material shall be adequately mixed, with a wetting agent recommended by the manufacturer of the agent to effectively wet dust and tailings, prior to deposition at a waste disposal site. Such agent shall be used as recommended for the particular dust by the manufacturer of the agent. There shall be no discharge of visible emissions to the outside air from the wetting operation except as specified in paragraph (f) of this section. Wetting may be suspended when the ambient temperature at the waste disposal site is less than −9.5°C (ca. 15°F). The ambient air temperature shall be determined by an appropriate measurement method with an accuracy of ±1°C (±2°F) and recorded at least at hourly intervals during the period that the operation of the wetting system is suspended. Records of such temperature measurements shall be retained at the source for a minimum of two years and made available for inspection by the Administrator.

(l) The owner of any inactive waste disposal site, which was operated by sources covered under § 61.22 (a), (c) or (h) and where asbestos-containing waste material produced by such sources was deposited, shall meet the following standards:

(1) There shall be no visible emissions to the outside air from an inactive waste disposal site subject to this paragraph, except as provided in paragraph (l)(5) of this section..

(2) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material was deposited, at intervals of 100 m (ca. 330 ft) or less, except as specified in paragraph (l)(4) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20'' x 14'' upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND	Notation
ASBESTOS WASTE DISPOSAL SITE	1'' Sans Serif, Gothic or Block
Do Not Create Dust	¾'' Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health	14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(3) The perimeter of the site shall be fenced in a manner adequate to deter access by the general public, except as specified in paragraph (l)(4) of this section.

(4) Warning signs and fencing are not required where the requirements of paragraphs (1)(5) .(i) or (ii) of this section are met, or where a natural barrier adequately deters access by the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(5) Rather than meet the requirement of paragraph (1)(1) of this section, an owner may elect to meet the requirements of this paragraph or may use an alternative control method for emissions from inactive waste disposal sites which

has received prior approval by the Administrator.

(i) The asbestos-containing waste material shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material, and a cover of vegetation shall be grown and maintained on the area adequate to prevent exposure of the asbestos-containing waste material; or

(ii) The asbestos-containing waste material shall be covered with at least 60 centimeters (ca. 2 feet) of compacted non-asbestos-containing material and maintained to prevent exposure of the asbestos-containing waste; or

(iii) For inactive waste disposal sites for asbestos tailings, a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion shall be applied. Such agent shall be used as recommended for the particular asbestos tailings by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

7. The first sentence in § 61.23 is revised as follows:

§ 61.23 Air-Cleaning.

If air-cleaning is elected, as permitted by §§ 61.22(f) and 61.22(d)(4)(iv), the requirements of this section must be met.

* * *

8. The first sentence in § 61.24 is revised and redesignated as paragraph (e) and new paragraphs (c) and (d) are added as follows:

§ 61.24 Reporting.

* * * * *

(c) For sources subject to §§ 61.22(j) and 61.22(k):

(1) A brief description of each process that generates asbestos-containing waste material.

(2) The average weight of asbestos-containing waste material disposed of, measured in kg/day.

(3) The emission control methods used in all stages of waste disposal.

(4) The type of disposal site or incineration site used for ultimate disposal, the name of the site operator, and the name and location of the disposal site.

(d) For sources subject to § 61.22(l):

(1) A brief description of the site.

(2) The method or methods used to comply with the standard, or alternative procedures to be used.

(e) Such information shall accompany the information required by § 61.10. The information described in this section shall be reported using the format of Appendix A of this part.

9. A new section 61.25 is added to subpart B as follows:

§ 61.25 Waste disposal sites.

In order to be an acceptable site for disposal of asbestos-containing waste material under § 61.22 (j) and (k), an active waste disposal site shall meet the requirements of this section.

(a) There shall be no visible emissions to the outside air from any active waste disposal site where asbestos-containing waste material has been deposited, except as provided in paragraph (e) of this section.

(b) Warning signs shall be displayed at all entrances, and along the property line of the site or along the perimeter of the sections of the site where asbestos-containing waste material is deposited, at intervals of 100 m (ca. 330 ft) or less except as specified in paragraph (d) of this section. Signs shall be posted in such a manner and location that a person may easily read the legend. The warning signs required by this paragraph shall conform to the requirements of 20" x 14" upright format signs specified in 29 CFR 1910.145(d)(4) and this paragraph. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to those specified in this paragraph.

LEGEND	Notation
ASBESTOS WASTE DISPOSAL SITE	1" Sans Serif, Gothic or Block
Do Not Create Dust	¾" Sans Serif, Gothic or Block
Breathing Asbestos is Hazardous to Your Health	14 Point Gothic

Spacing between lines shall be at least equal to the height of the upper of the two lines.

(c) The perimeter of the disposal site shall be fenced in order to adequately deter access to the general public except as specified in paragraph (d) of this section.

(d) Warning signs and fencing are not required where the requirements of paragraph (e)(1) of this section are met, or where a natural barrier adequately deters access to the general public. Upon request and supply of appropriate information, the Administrator will determine whether a fence or a natural barrier adequately deters access to the general public.

(e) Rather than meet the requirement of paragraph (a) of this section, an owner or operator may elect to meet the requirements of paragraph (e)(1) or (e)(2) of this section, or may use an alternative control method for emissions from active waste disposal sites which has received prior approval by the Administrator.

(1) At the end of each operating day, or at least once every 24-hour period while the site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with at least 15 centimeters (ca. 6 inches) of compacted non-asbestos-containing material.

(2) At the end of each operating day, or at least once every 24-hour period while the disposal site is in continuous operation, the asbestos-containing waste material which was deposited at the site during the operating day or previous 24-hour period shall be covered with a resinous or petroleum-based dust suppression agent which effectively binds dust and controls wind erosion. Such agent shall be used as recommended for the particular dust by the dust suppression agent manufacturer. Other equally effective dust suppression agents may be used upon prior approval by the Administrator. For purposes of this paragraph, waste crankcase oil is not considered a dust suppression agent.

Subpart E—National Emission Standard for Mercury

10. Section 61.50 is revised to read as follows:

§ 61.50 Applicability.

The provisions of this subpart are applicable to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge.

11. Section 61.51 is amended by adding paragraphs (l) and (m) as follows:

§ 61.51 Definitions.

* * * * *

(l) "Sludge" means sludge produced by a treatment plant that processes municipal or industrial waste waters.

(m) "Sludge dryer" means a device used to reduce the moisture content of sludge by heating to temperatures above 65°C (ca. 150°F) directly with combustion gases.

12. Section 61.52 is revised to read as follows:

§ 61.52 Emission standard.

(a) Emissions to the atmosphere from mercury ore processing facilities and mercury cell chlor-alkali plants shall not exceed 2300 grams of mercury per 24-hour period.

(b) Emissions to the atmosphere from sludge incineration plants, sludge drying plants, or a combination of these that process wastewater treatment plant sludges shall not exceed 3200 grams of mercury per 24-hour period.

13. Section 61.53 is amended by adding paragraph (d) as follows:

§ 61.53 Stack sampling.

* * * * *

(d) Sludge incineration and drying plants.

(1) Unless a waiver of emission testing is obtained under § 61.13, each owner or operator of a source subject to the standard in § 61.52(b) shall test emissions from that source. Such tests shall be conducted in accordance with the procedures set forth either in paragraph (d) of this section or in § 61.54.

(2) Method 101 in Appendix B to this part shall be used to test emissions as follows:

(i) The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date.

(ii) The test shall be performed within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(3) The Administrator shall be notified at least 30 days prior to an emission test, so that he may at his option observe the test.

(4) Samples shall be taken over such a period or periods as are necessary to determine accurately the maximum emissions which will occur in a 24-hour period. No changes shall be made in the operation which would potentially increase emissions above the level determined by the most recent stack test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(5) All samples shall be analyzed, and mercury emissions shall be determined within 30 days after the stack test. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(6) Records of emission test results and other data needed to determine total emissions shall be retained at the source and shall be made available, for inspection by the Administrator, for a minimum of 2 years.

14. Sections 61.54 and 61.55 are added as follows:

§ 61.54 Sludge sampling.

(a) As an alternative means for demonstrating compliance with § 61.52 (b), an owner or operator may use Method 105 of Appendix B and the procedures specified in this section.

(1) A sludge test shall be conducted within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) A sludge test shall be conducted within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

(b) The Administrator shall be notified at least 30 days prior to a sludge sampling test, so that he may at his option observe the test.

(c) Sludge shall be sampled according to paragraph (c) (1) of this section, sludge charging rate for the plant shall be determined according to paragraph (c) (2) of this section, and the sludge analysis shall be performed according to paragraph (c) (3) of this section.

(1) The sludge shall be sampled after dewatering and before incineration or drying, at a location that provides a representative sample of the sludge that is charged to the incinerator or dryer. Eight consecutive grab samples shall be obtained at intervals of between 45 and 60 minutes and thoroughly mixed into one sample. Each of the eight grab samples shall have a volume of at least 200 ml but not more than 400 ml. A total of three composite samples shall be obtained within an operating period of 24 hours. When the 24-hour operating period is not continuous, the total sampling period shall not exceed 72 hours after the first grab sample is obtained. Samples shall not be exposed to any condition that may result in mercury contamination or loss.

(2) The maximum - 24-hour period sludge incineration or drying rate shall be determined by use of a flow rate measurement device that can measure the mass rate of sludge charged to the incinerator or dryer with an accuracy of ±5 percent over its operating range. Other methods of measuring sludge mass charging rates may be used if they have received prior approval by the Administrator.

(3) The handling, preparation, and analysis of sludge samples shall be accomplished according to Method 105 in Appendix B of this part.

(d) The mercury emissions shall be determined by use of the following equation:

$$E_{Hg} = 1 \times 10^{-3} cQ$$

where

E_{Hg} = Mercury emissions, g/day.
c = Mercury concentration of sludge on a dry solids basis, µg/g (ppm).
Q = Sludge charging rate, kg/day.

(e) No changes in the operation of a plant shall be made after a sludge test has been conducted which would potentially increase emissions above the level determined by the most recent sludge test, until the new emission level has been estimated by calculation and the results reported to the Administrator.

(f) All sludge samples shall be analyzed for mercury content within 30 days after the sludge sample is collected. Each determination shall be reported to the Administrator by a registered letter dispatched before the close of the next business day following such determination.

(g) Records of sludge sampling, charging rate determination and other data needed to determine mercury content of wastewater treatment plant sludges shall be retained at the source and made available, for inspection by the Administrator, for a minimum of 2 years.

§ 61.55 Emission monitoring.

(a) Wastewater treatment plant sludge incineration and drying plants. All such sources for which mercury emissions exceed 1600 g/day, demonstrated either by stack sampling according to § 61.53 or sludge sampling according to § 61.54, shall monitor mercury emissions at intervals of at least once per year by use of Method 105 of Appendix B, or the procedures specified in § 61.54(c) and (d). The results of monitoring shall be reported and retained according to § 61.53(d) (5) and (6), or § 61.54(f) and (g).

15. Appendix A is revised to a new reporting format, and sections (I) (C) and (I) (D) are added as follows:

APPENDIX A

National Emission Standards for Hazardous Air Pollutants

Compliance Status Information

I. SOURCE REPORT

INSTRUCTIONS: Owners or operators of sources of hazardous pollutants subject to the National Emission Standards for Hazardous Air Pollutants are required to submit the information contained in Section I to the appropriate U.S. Environmental Protection Agency Regional Office prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

A list of regional offices is provided in §61.04. ____________________

A. SOURCE INFORMATION

1. Identification/Location - Indicate the name and address of each source.

1 2 Region   3 4 State   5 8 County   9 13 Source Number   000 14 16   00 17 18   1 19

20 22 AQCR #   23 26 City Code   27 Source Name 46

47 Street Address (Location of Plant) 66   80

Dup 1-18   19   20 City Name 34   State 35 39

40 State Regis. Number 64   55 58 NEDS X Ref.

59 SIC 62   FF 64   8 A/P 65   77 79 Staff   80

Dup 1-18   5 19   CS 30   STP 31   EC 49   80

2. Contact - Indicate the name and telephone number of the owner or operator or other responsible official whom EPA may contact concerning this report.

Dup 1-18 4 1
19 20 21 Name 43

44 46
Area Code 47 - Number 54 80

3. Source Description - Briefly state the nature of the source (e.g., "Chlor-alkali Plant" or "Machine Shop").

Dup 1-18 4 2
19 20 21 Description 50

51 Continued 79 80

4. Alternative Mailing Address - Indicate an alternative mailing address if correspondence is to be directed to a location different than that specified above.

Dup 1-18 4 3
19 20 21 Number Street or Box Number 45 80

Dup 1-18 4 4 37 38
19 20 21 City 35 State 41 Zip 44 80

5. Compliance Status - The emissions from this source ___ can ___ cannot meet the emission limitations contained in the National Emission Standards on or prior to 90 days after the effective date of any standards or amendments which require the submission of such information.

Signature of Owner, Operator or Other Responsible Official

NOTE: If the emissions from the source will exceed those limits set by the National Emission Standards for Hazardous Air Pollutants, the source will be in violation and subject to Federal enforcement actions unless granted a waiver of compliance by the Administrator of the U.S. Environmental Protection Agency. The information needed for such waivers is listed in Section II of this form.

B. PROCESS INFORMATION. Part B should be completed separately for each point of emission for each hazardous pollutant. [Sources subject to 61.22(1) may omit number 4. below.]

Dup 1-13 0 0 5
14 16 17 18 19 20 SCC 27 28 29 30 31
NEDS X Ref LS SIP

1. Pollutant Emitted - Indicate the type of hazardous pollutant emitted by the process. Indicate "AB" for asbestos, "BE" for beryllium, or "HG" for mercury.

32 33
Pollutant
34 Regulation 48
49
EC

2. Process Description - Provide a brief description of each process (e.g., "hydrogen end box" in a mercury chlor-alkali plant, "grinding machine" in a beryllium machine shop). Use additional sheets if necessary.

50 Process Description 74
80

Dup 1-18 6 1
19 20 21 50
51 79 80

Dup 1-18 6 2
19 20 21 50
51 79 80

3. Amount of Pollutant - Indicate the average weight of the hazardous material named in Item 1 which enters the process in pounds per month (based on the previous twelve months of operation).

Dup 1-18 6 3
19 20
21 27
lbs./mo.
29 36 80

4. Control Devices

a. Indicate the type of pollution control devices, if any, used to reduce the emissions from the process (e.g., venturi scrubber, baghouse, wet cyclone) and the estimated percent of the pollutant which the device removes from the process gas stream.

Dup 1-18 6 4
19 20
PRIMARY CONTROL DEVICE:
21 43

45 Primary Device Name 64
66 70
Percent Removal Efficiency
72 79

80

Dup 1-18 6 5 SECONDARY CONTROL DEVICES:
19 20 21 45

47 Secondary Device Name 64 66 70 % EFFIC. 72 79 80
Percent Removal Efficiency

b. Asbestos Emission Control Devices Only

i. If a baghouse is specified in Item 4a, give the following information:

- The air flow permeability in cubic feet per minute per square foot of fabric area.

Air flow permeability = __________ cfm/ft^2

- The pressure drop in inches water gauge across the filter at which the baghouse is operated.

Operating pressure drop = __________ inches w.g.

- If the baghouse material contains synthetic fill yarn, check whether this material is / / spun / / or not spun.

- If the baghouse utilizes a felted fabric, give the minimum thickness in inches and the density in ounces per square yard.

Thickness = __________ inches Density = __________ oz/yd^2

ii. If a wet collection device is specified in Item 4a, give the designed unit contacting energy in inches water gauge.

- Unit contacting energy = __________ inches w.g.

C. DISPOSAL OF ASBESTOS-CONTAINING WASTES. Part C should be completed separately for each asbestos-containing waste generation operation arising from sources subject to §61.22(a), (c), (e), and (h).

Dup 1-13 0 0 5
14 16 17 18 19 20 SCC 27 28 29 30 31
NEDS X Ref CS SIP

A B
32 33 34 Regulation 48 49
Pollutant EC

1. **Waste Generation** - Provide a brief description of each process that generates asbestos-containing waste (e.g. disposal of control device wastes).

50 Process Description 79 80

2. **Asbestos Concentration** - Indicate the average percentage asbestos content of these materials.

Dup 1-18 6 1 ASBESTOS CONCENTRATION:
19 20 21 43 45 48

%
50 80

3. **Amount of Wastes** - Indicate the average weight of asbestos-containing wastes disposed of, measured in kg/day.

Dup 1-18 6 2 kg/day
19 20 21 27 29 34 80

4. **Control Methods** - Indicate the emission control methods used in all stages of waste disposal, from collection, processing, and packaging to transporting and deposition.

Dup 1-18 6 3 Primary Control Method
19 20 21 43

45 79 80

Dup 1-18 6 4
19 20 21 50

51 79 80

5. **Waste Disposal** - Indicate the type of disposal site (sanitary landfill, open, covered) or incineration site (municipal, private) where the waste is disposed of and who operates the site (company, private, municipal). State the name and location of the site (closest city or town, county, state).

Dup 1-18 6 5 TYPE OF SITE:
19 20 21 33 35 50

51 79 80

Dup 1-18 6 6 19 20 OPERATOR: 21 29 31 50

51 79 80

Dup 1-18 6 7 19 20 LOCATION: 21 29

31 70

71 79 80

D. WASTE DISPOSAL SITES. Part D should be completed separately for each asbestos waste disposal site subject to section 61.22(1).

Dup 1-13 14 16 0 0 17 18 5 19 20 SCC 27 28 29 NEDS X Ref 30 CS 31 SIP

A B 32 33 Pollutant 34 Regulation 48 49 EC

WASTE DISPOSAL SITE 50 68 80

1. Description - Provide a brief description of the site, including its size and configuration, and the distance to the closest city or town, closest residence, and closest primary road.

Dup 1-18 6 1 19 20 SITE DESCRIPTION 21 37 39 50

51 79 80

Dup 1-18 6 2 19 20 DISTANCE: 21 29 TOWN: 30 34 36 40 K M 42 43

RESIDENCE: 45 54 56 60 K M 62 63 ROAD: 65 69 71 75

K M 77 78 80

2. Inactivation - After the site is inactivated, indicate the method or methods used to comply with the standard and send a list of the actions that will be undertaken to maintain the inactivated site.

Dup 1-18 6 8 COMPLIANCE METHOD/INACTIVE SITE:
19 20 21 ________________________________ 52

54 ________________________________ 79 80

II. WAIVER REQUESTS

A. WAIVER OF COMPLIANCE. Owners or operators of sources unable to operate in compliance with the National Emission Standards for Hazardous Air Pollutants prior to 90 days after the effective date of any standards or amendments which require the submission of such information may request a waiver of compliance from the Administrator of the U.S. Environmental Protection Agency for the time period necessary to install appropriate control devices or make modifications to achieve compliance. The Administrator may grant a waiver of compliance with the standard for a period not exceeding two years from the effective date of the hazardous pollutant standards, if he finds that such period is necessary for the installation of controls and that steps will be taken during the period of the waiver to assure that the health of persons will be protected from imminent endangerment.

The report information provided in Section I must accompany this application. Applications should be sent to the appropriate EPA regional office.

1. Processes Involved - Indicate the process or processes emitting hazardous pollutants to which emission controls are to be applied.

2. Controls

   a. Describe the proposed type of control device to be added or modification to be made to the process to reduce the emissions of hazardous pollutants to an acceptable level. (Use additional sheets if necessary.)

   b. Describe the measures that will be taken during the waiver period to assure that the health of persons will be protected from imminent endangerment. (Use additional sheets if necessary.)

3. Increments of Progress - Specify the dates by which the following increments of progress will be met.

   - Date by which contracts for emission control systems or process modifications will be awarded; or date by which orders will be issued for the purchase of the component parts to accomplish emission control or process modification.

Dup 1-16 0 1 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

- Date of initiation of on-site construction or installation of emission control equipment or process change.

Dup 1-16 0 2 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

- Date by which on-site construction or installation of emission control equipment or process modification is to be completed.

Dup 1-16 0 3 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

- Date by which final compliance is to be achieved.

Dup 1-16 0 4 7
17 19 53 54 55 60 61 MO/DY/YR 66 80

B. WAIVER OF EMISSION TESTS. A waiver of emission testing may be granted to owners or operators of sources of beryllium or mercury pollutants if, in the judgment of the Administrator of the Environmental Protection Agency the emissions from the source comply with the appropriate standard or if the owners or operators of the source have requested a waiver of compliance or have been granted a waiver of compliance.

This application should accompany the report information provided in Section I.

1. Reason - State the reasons for requesting a waiver of emission testing. If the reason stated is that the emissions from the source are within the prescribed limits, documentation of this condition must be attached.

____

____

Date

Signature of the owner or operator

APPENDIX B—TEST METHODS

16. Method 105 is added to Appendix B as follows;

* * * * *

METHOD 105. METHOD FOR DETERMINATION OF MERCURY IN WASTEWATER TREATMENT PLANT SEWAGE SLUDGES

1. *Principle and applicability.* 1.1 Principle—A weighed portion of the sewage sludge sample is digested in aqua regia for 2 minutes at 95°C, followed by oxidation with potassium permanganate. Mercury in the digested sample is then measured by the conventional spectrophotometer cold vapor technique. An alternative digestion involving the use of an autoclave is described in paragraph 4.5.2 of this method.

1.2 Applicability—This method is applicable for the determination of total organic and inorganic mercury content in sewage sludges, soils, sediments, and bottom-type materials. The normal range of this method is 0.2 to 5 μg/g. The range may be extended above or below the normal range by increasing or decreasing sample size and through instrument and recorder control.

2. *Apparatus.* 2.1 Analysis—The conventional cold vapor technique(5) is used to analyze the sample.

2.1.1 Atomic Absorption Spectrophotometer [1]—Any atomic absorption unit having an open sample presentation area in which to mount the absorption cell is suitable. Instrument settings recommended by the particular manufacturer should be followed.

2.1.2 Mercury Hollow Cathode Lamp—Westinghouse WL-22847, argon filled, or equivalent.

2.1.3 Recorder—Any multirange, variable-speed recorder that is compatible with the UV detection system is suitable.

2.1.4 Absorption Cell—Standard spectrophotometer cells 10 cm long, having quartz end windows may be used. Suitable cells may be constructed from plexiglass tubing, 2.5 cm O.D. x 11.4 cm (ca. 1" O.D. x 4½"). The ends are ground perpendicular to the longitudinal axis, and quartz windows [2.5 cm diameter x 0.16 cm thickness (ca. 1" diameter x 1/16" thickness)] are cemented in place. Gas inlet and outlet ports [also of plexiglass but 0.6 cm O.D. (ca. ¼" O.D.)] are attached approximately 1.3 cm (½") from each end. The cell is strapped to a burner for support and aligned in the light beam to give the maximum transmittance. NOTE: Two 5.1 cm x 5.1 cm (ca. 2" x 2") cards with 2.5 cm (ca. 1") diameter holes may be placed over each end of the cell to assist in positioning the cell for maximum transmittance.

2.1.5 Air Pump—Any peristaltic pump capable of delivering 1 liter of air per minute may be used. A Masterflex pump with electronic speed control has been found to be satisfactory. (Regulated compressed air can be used in an open one-pass system.)

2.1.6 Flowmeter—Capable of measuring an air flow of 1 liter per minute.

2.1.7 Aeration Tubing—Tygon tubing is used for passage of the mercury vapor from the sample bottle to the absorption cell and return. Straight glass tubing terminating in a coarse porous frit is used for sparging air into the sample.

2.1.8 Drying Tube—15 cm long x 1.9 cm diameter (ca. 6" long x ¾" diameter) tube containing 20 grams of the desiccant magnesium perchlorate. The apparatus is assembled as shown in Figure 105 1. In place of the magnesium perchlorate drying tube, a small reading lamp with 60W bulb may be used to prevent condensation of moisture inside the cell. The lamp is positioned so as not to interfere with the measurement and to shine on the absorption cell maintaining the air temperature about 5°C above ambient.

3. *Reagents.* 3.1 Analysis.

3.1.1 Aqua Regia—Prepare immediately before use by carefully adding three volumes of concentrated HCl to one volume of concentrated HNO_3.

3.1.2 Sulfuric Acid, 0.5N—Dilute 14.0 ml of concentrated sulfuric acid to 1.0 liter.

3.1.3 Stannous Sulfate—Add 25 g stannous sulfate to 250 ml of 0.5N sulfuric acid. This mixture is a suspension and should be stirred continuously during use. Stannous chloride may be used in place of the stannous sulfate.

3.1.4 Sodium Chloride—Hydroxylamine Sulfate Solution—Dissolve 12 grams of sodium chloride and 12 grams of hydroxylamine sulfate in distilled water and dilute to 100 ml. Hydroxylamine hydrochloride may be used in place of the hydroxylamine sulfate.

3.1.5 Potassium Permanganate—5% solution, w/v. Dissolve 5 grams of potassium permanganate in 100 ml of distilled water.

3.1.6 Stock Mercury Solution—Dissolve 0.1354 grams of reagent grade mercuric chloride (Assay >95%) in 75 ml of distilled water. Add 10 ml of concentrated nitric acid and adjust the volume to 100.0 ml. 1 ml=1 mg Hg.

3.1.7 Working Mercury Solution—Make successive dilutions of the stock mercury solution to obtain a working standard containing 0.1 μg per ml. This working standard and the dilutions of the stock mercury solution should be prepared fresh daily. Acidity of the working standard should be maintained at 0.15% nitric acid. This acid should be added to the flask as needed before the addition of the aliquot. Mercuric solutions should not be prepared in plastic containers.

4. *Procedures.* Samples for mercury analysis are subject to contamination from a variety of sources. Extreme care must be taken to prevent contamination. Certain interferences may occur during the analysis procedures. Extreme caution must be taken to avoid inhalation of mercury.

4.1 Sample Handling and Preservation.

4.1.1 Because of the extreme sensitivity of the analytical procedure and the omnipresence of mercury, care must be taken to avoid extraneous contamination. Sampling devices, sample containers, and reagents should be ascertained to be free of significant amounts of mercury; the sample should not be exposed to any condition in the laboratory that may result in contact or airborne mercury contamination. Sample containers to be used for collection and shipment of mercury samples should be properly cleaned before use. These should be rinsed with at least 20% v/v HNO_3 followed by distilled water.

4.1.2 While the sample may be analyzed without drying, it has been found to be more convenient to analyze a dry sample. Moisture may be driven off in a drying oven at a temperature of 60°C. No significant mercury losses have been observed by using this drying step. The dry sample should be pulverized and thoroughly mixed before the aliquot is weighed.

4.2 Interferences.

4.2.1 Interferences that may occur in sludge samples are sulfides, high copper, high chlorides, etc. A discussion of possible interferences and suggested preventative measures to be taken is given in Reference (6)(7).

4.2.2 Volatile materials which absorb at the 253.7 nm will cause a positive interference. In order to remove any interfering volatile materials, the dead air space in the BOD bottle should be purged with nitrogen before the addition of stannous sulfate.

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[1] Instruments designed specifically for the measurement of mercury using the cold vapor technique are commercially available and may be substituted for the atomic absorption spectrophotometer.

4.3 Handling Sample Mercury Vapors After Analysis.

4.3.1 Because of the toxic nature of mercury vapor, precaution must be taken to avoid its inhalation. Therefore, a bypass should be included in the analysis system to either vent the mercury vapor into an exhaust hood or pass the vapor through some absorbing media, such as:

(a) equal volumes of 0.1N $KMNO_4$ and 10% H_2SO_4;

(b) 0.25% iodine in a 3% KI solution.

A specially treated charcoal that will absorb mercury vapor is also available from Barnebey and Cheney, E. 8th Ave. and North Cassidy St., Columbus, Ohio 43219, Catalog No. 580-13 or No. 580-22.[3]

4.4 Calibration.

4.4.1 Transfer 0, 0.5, 1.0, 2.0, 5.0 and 10 ml aliquots of the working mercury solution containing 0 to 1.0 μg of mercury to a series of 300-ml BOD bottles. Add enough distilled water to each bottle to make a total volume of 10 ml. Add 5 ml of aqua regia and heat 2 minutes in a water bath at 95°C. Allow the sample to cool and add 50 ml distilled water and 15 ml of $KMnO_4$ solution to each bottle and return to the water bath for 30 minutes. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Add 50 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate solution and immediately attach the bottle to the aeration apparatus. At this point, the sample is allowed to stand quitely without manual agitation. The circulating pump, which has previously been adjusted to a rate of 1 liter per minute, is allowed to run continuously. The absorbance, as exhibited either on the spectrophotometer or the recorder, will increase and reach maximum within 30 seconds. As soon as the recorder pen levels off, approximately 1 minute, open the bypass valve and continue the aeration until the absorbance returns to its minimum value. Close the bypass valve, remove the fritted tubing from the BOD bottle and continue the aeration. Proceed with the standards and construct a standard curve by plotting peak height versus micrograms of mercury.

4.5 Analysis.

4.5.1 Weigh triplicate 0.2g ± 0.001 g portions of dry sample and place in bottom of a BOD bottle. Add 5 ml of distilled water and 5 ml of aqua regia. Heat 2 minutes in a water bath at 95°C. Cool and add 50 ml distilled water and 15 ml potassium permanganate solution to each sample bottle. Mix thoroughly and place in the water bath for 30 minutes at 95°C. Cool and add 6 ml of sodium chloride-hydroxylamine sulfate to reduce the excess permanganate. Add 55 ml of distilled water. Treating each bottle individually, add 5 ml of stannous sulfate and immediately attach the bottle to the aeration apparatus. With each sample, continue as described in paragraph 4.4.1 of this method.

4.5.2 An alternative digestion procedure using an autoclave may also be used. In this method 5 ml of concentrated H_2SO_4 and 2 ml of concentrated HNO_3 are added to the 0.2 grams of sample. 5 ml of saturated $KMnO_4$ solution are added and the bottle is covered with a piece of aluminum foil. The samples are autoclaved at 121°C and 2.1 kg/cm^2 (ca. 15 psig) for 15 minutes. Cool, make up to a volume of 100 ml with distilled water, and add 6 ml of sodium chloride-hydroxylamine sulfate solution to reduce the excess permanganate. Purge the dead air space and continue as described in paragraph 4.4.1 of this method.

5. *Calculation.* 5.1 Measure the peak height of the unknown from the chart and read the mercury value from the standard curve.

5.2 Calculate the mercury concentration in the sample by the formula:

$$\mu g\ Hg/gm = \frac{\mu g\ Hg \text{ in the aliquot}}{\text{wt. of the aliquot in g}}$$

5.3 Report mercury concentrations as follows: Below 0.1 μg/g; between 0.1 and 1 μg/g, to the nearest 0.01 μg/g; between 1 and 10 μg/g, to nearest 0.1 μg; above 10 μg/g, to nearest μg.

6. *Precision and accuracy.* 6.1 According to the provisional method in reference number 5, the following standard deviations on replicate sediment samples have been recorded at the indicated levels: 0.29 μg/g ± 0.02, and 0.82 μg/g ± 0.03. Recovery of mercury at these levels, added as methyl mercuric chloride, was 97 and 94%, respectively.

7. *References.*

1. Bishop, J. N. "Mercury in Sediments," Ontario Water Resources Comm., Toronto, Ontario, Canada, 1971.

2. Salma, M. Private communication, EPA Cal/Nev Basin Office, Alameda, California.

3. Hatch, W. R., and Ott, W. L. "Determination of Sub-Microgram Quantities of Mercury by Atomic Absorption Spectrophotometry," Ana. Chem. *40*, 2085 (1968).

4. Bradenberger, H. and Bader, H. "The Determination of Nanogram Levels of Mercury in Solution by a Flameless Atomic Absorption Technique," Atomic Absorption Newsletter 6, 101 (1967).

5. Analytical Quality Control Laboratory (AQCL), Environmental Protection Agency, Cincinnati, Ohio, "Mercury in Sediment (Cold Vapor Technique)," Provisional Method, April 1972.

6. Kopp, J. F., Longbottom, M. C. and Lobring, L. B. "Cold Vapor Method for Determining Mercury," Journal AWWA, 64, 1 (1972), pp. 20–25.

7. "Manual of Methods for Chemical Analysis of Water and Wastes," Environmental Protection Agency, EPA-625/2-74-003, pp. 118–138.

[FR Doc.75-27231 Filed 10-14-75;8:45 am]

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[3] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

8

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of New York

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of New York on August 6, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published elsewhere in today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the New York Department of Environmental Conservation, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 6, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

42 U.S.C. 1857c–7

Dated: October 4, 1975.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In 61.04 paragraph (b) is amended by revising subparagraph (HH) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(HH)—New York: New York State Department of Environmental Conservation, 50 Wolf Road, Albany, New York 12233, attention: Division of Air Resources.

* * * * *

[FR Doc.75–27581 Filed 10–14–75;8:45 am]

FEDERAL REGISTER, VOL. 40, NO. 200—
—WEDNESDAY, OCTOBER 15, 1975

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Colorado

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Colorado on August 27, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published today in the Federal Register. The amended § 61.04, which adds the address of the Colorado Air Pollution Control Division to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 27, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c–7.

Dated: October 22, 1975.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (G) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(G)—State of Colorado, Colorado Air Pollution Control Division, 4210 East 11th Avenue, Denver, Colorado 80220.

* * * * *

[FR Doc.75-29237 Filed 10–30–75;8:45 am]

FEDERAL REGISTER, VOL. 40, NO. 211—
—FRIDAY, OCTOBER 31, 1975

10 [FRL 470-4]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Washington Local Agencies

Pursuant to section 112(d) of the Clean Air Act, as amended, the Regional Administrator of Region X, Environmental Protection Agency (EPA), delegated to the State of Washington Department of Ecology on February 28, 1975, the authority to implement and enforce the program for national emission standards for hazardous air pollutants (NESHAPS). The delegation was announced in the FEDERAL REGISTER on April 1, 1975 (40 FR 14632). On April 25, 1975 (40 FR 18169) the Assistant Administrator for Air and Waste Management promulgated a change to 40 CFR 61.04, *Address*, to reflect the delegation to the State of Washington.

On September 22 and 23, 1975, the State Department of Ecology requested EPA's concurrence in the State's subdelegation of the NESHAPS program to four local air pollution control agencies. After reviewing the State's request, the Regional Administrator determined that the sub-delegations meet all the requirements outlined in EPA's delegation of February 28, 1975. Therefore, the Regional Administrator on October 15, 1975, concurred in the sub-delegations to the four local agencies listed below with the stipulation that all the conditions placed on the original delegation to the State shall also apply to the sub-delegations to the local agencies. EPA is today amending 40 CFR 61.04 to reflect the State's sub-delegations.

The amended § 61.04 provides that all reports, requests, applications, submittals and communications required pursuant to Part 61 which were previously to be sent to the Director of the State of Washington Department of Ecology (DOE) will now be sent to the Puget Sound Air Pollution Control Agency (PSAPCA), the Northwest Air Pollution Authority (NWAPA), the Spokane County Air Pollution Authority (SCAPA) or the Yakima County Clean Air Authority (YCCAA), as appropriate. It should be noted that the delegation to the YCCAA applies only to demolition projects containing asbestos. Other source categories located in Yakima County subject to the NESHAPS regulation should continue to address all correspondence to the Department of Ecology. The amended section is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on September 22 to the YCCAA and September 23 to the other three agencies, and it serves no useful purpose to delay the technical change of the addition of the local agency addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: December 15, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b)(WW) is revised to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(WW)(i) Washington; State of Washington, Department of Ecology, Olympia, Washington 98504.

(ii) Northwest Air Pollution Authority, 207 Pioneer Building, Second and Pine Streets, Mount Vernon, Washington 98273.

(iii) Puget Sound Air Pollution Control Agency, 410 West Harrison Street, Seattle, Washington 98119.

(iv) Spokane County Air Pollution Control Authority, North 811 Jefferson, Spokane, Washington 99201.

(v) Yakima County Clean Air Authority, County Courthouse, Yakima, Washington 98901.

* * * * *

[FR Doc.75-34161 Filed 12-17-75;8:45 am]

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11 [FRL 476-8]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Maine

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Maine on November 3, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the FEDERAL REGISTER.[1] The amended § 61.04, which adds the address of the Maine Department of Environmental Protection to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on October 7, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

(42 U.S.C. 1857c-7)

Dated: December 22, 1975.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (U) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(U) State of Maine, Department of Environmental Protection, State House, Augusta, Maine 04330.

* * * * *

[FR Doc.75-35064 Filed 12-29-75;8:45 am]

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[1] See FR Doc. 75-35063 appearing elsewhere in the Notices section of today's FEDERAL REGISTER.

12

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of Michigan

Pursuant to the delegation of authority for national emission standards for hazardous air pollutant (NESHAPS) to the State of Michigan on November 5, 1975, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation.[1] The amended Section 61.04, which adds the address of the Air Pollution Control Division, Michigan Department of Natural Resources to that list of addresses to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must be sent, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 5, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authortiy of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c–7.

Dated: December 31, 1975.

Stanley W. Legro,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising subparagraph X, to read as follows:

61.04 Address.

* * * * *

(b) * * *

(A)–(W) * * *

(X) State of Michigan, Air Pollution Control Division, Michigan Department of Natural Resources, Stevens T. Mason Building, 8th Floor, Lansing, Michigan 48926.

* * * * *

[FR Doc.76-848 Filed 1-12-76;8:45 am]

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[1] A Notice announcing this delegation is published in the Notices section of this issue.

13

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Washington Local Agencies

Pursuant to section 112(d) of the Clean Air Act, as amended, the Regional Administrator of Region X, Environmental Protection Agency (EPA), delegated to the State of Washington Department of Ecology on February 28, 1975, the authority to implement and enforce the program for national emission standards for hazardous air pollutants (NESHAPS). The delegation was announced in the Federal Register on April 1, 1975 (40 FR 14632). On April 25, 1975 (40 FR 18169) the Assistant Administrator for Air and Waste Management promulgated a change to 40 CFR 61.04, *Address*, to reflect the delegation to the State of Washington.

On October 23, 1975, the State Department of Ecology requested EPA's concurrence in the State's sub-delegation of the NESHAPS program to two local air pollution control agencies. Previously, EPA concurred in the State's sub-delegation to four local agencies. See 40 FR 58646, December 18, 1975. After reviewing the State's October 23 request the Regional Administrator determined that the sub-delegations met all the requirements outlined in EPA's delegation of February 28, 1975. Therefore, the Regional Administrator on December 5, 1975, concurred in the sub-delegations to the two local agencies listed below with the stipulation that all the conditions placed on the original delegation to the State shall also apply to the sub-delegations to the local agencies. EPA is today amending 40 CFR 61.04 to reflect the State's sub-delegations.

The amended § 61.04 provides that all reports, requests, applications, submittals and communications required pursuant to Part 61 which were previously to be sent to the Director of the State of Washington Department of Ecology (DOE) will now be sent to the Olympic Air Pollution Control Authority or the Southwest Air Pollution Control Authority, as appropriate. The amended section is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on October 23, 1975 and it serves no useful purpose to delay the technical change of the addition of the local agency addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c–7.

Dated: January 24, 1976.

Stanley W. Legro,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by adding subparagraphs (WW) (vi) and (vii) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(WW) * * *

(vi) Olympic Air Pollution Control Authority, 120 East State Avenue, Olympia, Washington 98501.

(vii) Southwest Air Pollution Control Authority, Suite 7601 H, NE Hazel Dell Avenue, Vancouver, Washington 98665.

* * * * *

[FR Doc.76-2674 Filed 1-28-76;8:45 am]

14

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Oregon

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Oregon on November 10, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today at 41 FR 7749 in the FEDERAL REGISTER. The amended § 61.04, which adds the address of Oregon Department of Environmental Quality to which all reports, requests, applications, submittals, and communications pursuant to this part must be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 10, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: February 11, 1976.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (MM) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(L) * * *

(MM)—State of Oregon, Department of Environmental Quality, 1234 SW Morrison Street, Portland, Oregon 97205.

* * * * *

[FR Doc.76-4963 Filed 2-19-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 35—

—FRIDAY, FEBRUARY 20, 1976

15

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Commonwealth of Virginia

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the Commonwealth of Virginia on December 30, 1975, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today at 41 FR 8416 in the FEDERAL REGISTER. The amended § 61.04, which adds the address of the Virginia State Air Pollution Control Board to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on December 30, 1975, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: February 21, 1976.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising subparagraph (VV) to read as follows:

§ 61.01 Address.

* * * * *

(b) * * *

(A)-(UU) * * *

(VV) Commonwealth of Virginia, Virginia State Air Pollution Control Board, Room 1106, Ninth Street Office Building, Richmond, Virginia 23219.

[FR Doc.76-6505 Filed 2-25-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 39—

—THURSDAY, FEBRUARY 26, 1976

16

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Connecticut

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Connecticut on December 9, 1975, EPA is today amending 40 CFR 61.04. *Address*, to reflect this delegation. A Notice announcing this delegation is published today at (41 FR 11874) in the FEDERAL REGISTER. The amended § 61.04, which adds the address to the Connecticut Department of Environmental Protection to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on December 9, 1975, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

(42 U.S.C. 1857c-7)

Dated: March 15, 1976.

STANLEY W. LEGRO,
Assistant Administrator of Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (H) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(H) State of Connecticut, Department of Environmental Protection, State Offce Building, Hartford, Connecticut 06115.

* * * * *

[FR Doc.76-7968 Filed 3-19-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 56—

—MONDAY, MARCH 22, 1976

17

[FRL 539-6]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Commonwealth of Massachusetts

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the Commonwealth of Massachusetts on January 23, 1976, EPA is today amending 40 CFR 61.04, "Address, to reflect this delegation. A Notice announcing this delegation is published in the Notices section of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the Massachusetts Department of Environmental Quality Engineering, Division of Air Quality Control, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on January 23, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

42 U.S.C. 1857c-7.

Dated: May 3, 1976.

STANLEY W. LEGRO,
Assistant Administrator
of Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (W) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(W) Massachusetts Department of Environmental Quality Engineering, Division of Air Quality Control, 600 Washington Street, Boston, Massachusetts 02111.

[FR Doc.76-13824 Filed 5-12-76;8:45 am]

[FRL 539-8]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of New Hampshire

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of New Hampshire on February 17, 1976, EPA is today amending 40 CFR 61.04, "Address," to reflect this delegation. A Notice announcing this delegation is published in the Notices section of today's FEDERAL REGISTER. The amended § 61.04, which adds the address of the New Hampshire Air Pollution Control Agency to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on February 17, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: May 3, 1976.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (EE) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(EE) New Hampshire Air Pollution Control Agency, Department of Health and Welfare, State Laboratory Building, Hazen Drive, Concord, New Hampshire 03301.

* * * * *

[FR Doc.76-13823 Filed 5-12-76;8:45 am]

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Ventura County and Northern Sonoma County Air Pollution Control Districts

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Ventura County Air Pollution Control District and the Northern Sonoma County Air Pollution Control District, dated February 2, 1976, EPA is today amending 40 CFR 61.04, *Address* to reflect this delegation. A Notice announcing this delegation is published today in the Notices section of this issue. The amended § 61.04 is set forth below. It adds the addresses of the Ventura County and Northern Sonoma County Air Pollution Control Districts, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on February 2, 1976, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District addresses to the Code of Federal Regulations.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. Section 61.04(b) is amended by revising subparagraph (F) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(*F*) California—

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 *Flower* St. (P.O. Box 997), Bakersfield, CA 93302.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001.

* * * * *

This rule making is effective immediately.

(Sec. 112 of the Clean Air Act, as amended [42 U.S.C. 1857c-7]).

Dated: May 3, 1976.

STANLEY W. LEGRO,
Assistant Administrator
for Enforcement.

[FR Doc.76-15256 Filed 5-25-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 103—WEDNESDAY, MAY 26, 1976

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19 **Title 40—Protection of Environment**

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 564-6]

NEW SOURCE REVIEW

Delegation of Authority to the State of Georgia

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of Georgia authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in the Notices section this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent instead to the Environmental Protection Division, Georgia Department of Natural Resources, 270 Washington Street SW., Atlanta, Georgia 30334, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on May 3, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal regulations.

This rulemaking is effective immediately, and is issued under the authority of Sections 101, 110, 111, 112 and 301 of the Clean Air Act, as amended 42 U.S.C. 1857, 1857C-5, 6, 7 and 1857g.

Dated: June 11, 1976.

JACK E. RAVAN,
Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

DELEGATION OF AUTHORITY TO THE STATE OF GEORGIA

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

3. In § 61.04, paragraph (b) (L) is revised to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(L) State of Georgia, Environmental Protection Division, Department of Natural Resources, 270 Washington Street, S.W., Atlanta, Georgia 30334.

* * * * *

[FR Doc.76-17911 Filed 6-18-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 120—MONDAY, JUNE 21, 1976

20

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Fresno, Mendocino, San Joaquin, and Sacramento County Air Pollution Control Districts

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Fresno County Air Pollution Control District, the Mendocino County Air Pollution Control District, the San Joaquin County Air Pollution Control District, and the Sacaramento County Air Pollution Control District, dated March 29, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the Notice Section of this issue. The amended § 61.04 is set forth below. It adds the addresses of the Fresno County, Mendocino County, San Joaquin County, and Sacramento County Air Pollution Control Districts, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these Air Pollution Control Districts.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on March 29, 1976, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended [42 U.S.C. 1857c–7].

Dated: June 15, 1976.

STANLEY W. LEGRO,
Assistant Administrator for Enforcement.

Part 61 of Chapter I, Title 40, of the Code of Federal Regulations, is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *
(A)–(E) * * *
(F) California:

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531
Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501
Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901
Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404
Sacramento County Air Pollution Control District, 2221 Stockton Blvd., Sacramento, CA 95827
San Joaquin County Air Pollution Control District, 1601 E. Hazelton St. (P.O. Box 2009), Stockton, CA 95201
Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093
Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001

* * * * *

[FR Doc.76–19570 Filed 7–7–76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 132
THURSDAY, JULY 8, 1976

FEDERAL REGISTER, VOL. 41, NO. 154
MONDAY, AUGUST 9, 1976

21

[FRL 597–2]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Madera County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Madera County Air Pollution Control District, dated May 12, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the notices section of this issue of the FEDERAL REGISTER, Environmental Protection Agency, FRL 596–8. The amended § 61.04 is set forth below. It adds the address of the Madera County to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on May 12, 1976, and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District address to the Code of Federal Regulations.

This rule making is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended [42 U.S.C. 1857c–7].

Dated: July 27, 1976.

PAUL DEFALCO,
Regional Administrator,
Region IX, EPA.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

F—CALIFORNIA

Bay Area Pollution Control District, 939 Ellis St., San Francisco, CA 94109
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531
Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501
Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302
Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901
Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404
Sacramento County Air Pollution Control District, 2221 Stockton Blvd., Sacramento, CA 95827
San Joaquin County Air Pollution Control District, 1601 E. Hazelton St. (P.O. Box 2009), Stockton, CA 95201
Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093
Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001

* * * * *

[FR Doc.76–23147 Filed 8–6–76;8:45 am]

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[FRL 900-5]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the U.S. Virgin Islands

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the U.S. Virgin Islands on June 30, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published at page 34685 of today's Federal Register. The amended § 61.04, which adds the address of the U.S. Virgin Islands Department of Conservation and Cultural Affairs, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on June 30, 1976, and it serves no purpose to delay the technical change of this addition of the U.S. Virgin Islands address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended.

(42 U.S.C. 1857c-7)

Dated: August 4, 1976.

Gerald M. Hansler,
Regional Administrator,
Region II.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (CCC) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(BBB) * * *

(CCC)—U.S. Virgin Islands: U.S. Virgin Islands Department of Conservation and Cultural Affairs, P.O. Box 578, Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00801.

[FR Doc.76-23809 Filed 8-13-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 159

MONDAY, AUGUST 16, 1976

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

6. By revising § 61.15 to read as follows:

§ 61.15 Availability of information.

The availability to the public of information provided to, or otherwise obtained by, the Administrator under this part shall be governed by Part 2 of this chapter.

FEDERAL REGISTER, VOL. 41, NO. 171

WEDNESDAY, SEPTEMBER 1, 1976

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[FRL 617-3]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Stanislaus County Air Pollution Control District; Delegation of Authority to State of California on Behalf of Sacramento County Air Pollution Control District; Correction

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Stanislaus County Air Pollution Control District, dated July 2, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A notice announcing this delegation is published today at 41 FR 40107. The amended § 61.04 is set forth below. It adds the address of the Stanislaus County Air Pollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

On July 8, 1976, EPA amended 40 CFR 61.04, *Address*, to reflect delegation of authority for NESHAPS to the State of California on behalf of the Sacramento County Air Pollution Control District. By letter of July 30, 1976, Colin T. Greenlaw, M.D., Sacramento County Air Pollution Control Officer, notified EPA that the address published at 41 FR 27967 was incorrect. Therefore, EPA is today also amending 40 CFR 61.04, *Address* to reflect the correct address for the Sacramento County Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are reflected by this administrative amendment were effective on July 2, 1976 and March 29, 1976 and it serves no purpose to delay the technical change of these additions of the Air Pollution Control Districts addresses to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7).

Dated: September 8, 1976.

L. Russell Freeman,
Acting Regional Administrator,
Region IX, Environmental
Protection Agency.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b)(F) is revised to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(F)—California:

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109
Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531
Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702
Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501
Kern County Air Pollution Control District, 1700 Flower St. (P.O. Box 997), Bakersfield, CA 93302
Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637
Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482
Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901
Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404
Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827
San Joaquin County Air Pollution Control District, 1601 Hazleton St. (P.O. Box 2009), Stockton, CA 95201
Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350
Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093
Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001

* * * * *

[FR Doc.76-27176 Filed 9-16-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 182—FRIDAY, SEPTEMBER 17, 1976

25

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 619-1]

SUBCHAPTER C—AIR PROGRAMS

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Reports and Applications From Operators of New Sources; Address Changes

DELEGATION OF AUTHORITY TO THE STATE OF ALABAMA

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of Alabama authority to review new and modified sources. The delegated authority includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously reuired for the delegated reviews will now be sent instead to the Air Pollution Control Division, Alabama Air Pollution Control Commission, 645 South McDonough Street, Montgomery, Alabama 36104, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 5, 1976, and it serves no purpose to delay the technical change of this addition of the State adoress to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 111, 112, and 301 of the Clean Air Act, as amended 42 U.S.C. 1857, 1857c-5, 6, 7 and 1857g.

Dated: September 9, 1976.

JACK E. LAVAN,
Regional Administrator.

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

2. In § 61.04, paragraph (b) is amended by revising subparagraph (B) to read as follows:

§ 61.04 Address.

• • • • •

(b) • • •

(B) State of Alabama, Air Pollution Control Division, Air Pollution Control Commission, 645 S. McDonough Street, Montgomery, Alabama 36104.

• • • • •

[FR Doc.76-27397 Filed 9-17-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 183—MONDAY, SEPTEMBER 20, 1976

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of Indiana

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Indiana on April 21, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A notice announcing this delegation is published Thursday, September 30, 1976 (41 FR 43237). The amended § 61.04, which adds the address of the Indiana Air Pollution Control Board to that list of addresses to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must be sent, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on April 21, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately.

(Sec. 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.)

Dated: September 22, 1976.

GEORGE R. ALEXANDER, Jr.,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In 61.04, paragraph (b) is amended by revising subparagraph P, to read as follows:

§ 61.04 Address.

• • • • •

(b) • • •

(A)-(O) • • •

(P) State of Indiana, Indiana Air Pollution Control Board, 1330 West Michigan Street, Indianapolis, Indiana 46206.

• • • • •

[FR Doc.76-28507 Filed 9-29-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 191
THURSDAY, SEPTEMBER 30, 197

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Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 629-8]

PART 60—STANDARDS OF PERFORMANCE FOR STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of North Dakota

Pursuant to the delegation of authority for the standards of performance for new sources (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) to the State of North Dakota on August 30, 1976, EPA is today amending respectively 40 CFR 60.4 and 61.04 Address, to reflect this delegation. A notice announcing this delegation is published today in the notices section. The amended §§ 60.4 and 61.04 which add the address of the North Dakota State Department of Health to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to these parts must also be addressed, are set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on August 30, 1976, and it serves no purpose to delay the technical change of this addition to the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 111 and 112 of the Clean Air Act, as amended, (42 U.S.C. 1857c-6 and -7).

Dated: October 1, 1976.

JOHN A. GREEN,
Regional Administrator.

Parts 60 and 61 of Chapter I, Title 40 of the Code of Federal Regulations are respectively amended as follows:

2. In § 61.04, paragraph (b) is amended by revising subparagraph (JJ) to read as follows:

§ 61.04 Address.

• • • • •

(b) • • •

(A)-(Z) • • •
(AA)-(ZZ) • • •
(JJ)—State of North Dakota, State Department of Health, State Capitol, Bismarck, North Dakota 58501.

• • • • •

[FR Doc.76-30020 Filed 10-12-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 199—WEDNESDAY, OCTOBER 13, 1976

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 618-1]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Standard for Vinyl Chloride

On December 24, 1975, under section 112 of the Clean Air Act, as amended (42 U.S.C. 1857), the Environmental Protection Agency (EPA) added vinyl chloride to the list of hazardous air pollutants (40 FR 59477) and proposed a national emission standard for it (40 FR 59532). The standard covers plants which manufacture ethylene dichloride, vinyl chloride, and/or polyvinyl chloride.

EPA decided to regulate vinyl chloride because it has been implicated as the causal agent of angiosarcoma and other serious disorders, both carcinogenic and noncarcinogenic, in people with occupational exposure and in animals with experimental exposure to vinyl chloride. Reasonable extrapolations from these findings cause concern that vinyl chloride may cause or contribute to the same or similar disorders at present ambient air levels. The purpose of the standard is to minimize vinyl chloride emissions from all known process and fugitive emission sources in ethylene dichloride-vinyl chloride and polyvinyl chloride plants to the level attainable with best available control technology. This will have the effect of furthering the protection of public health by minimizing the health risks to the people living in the vicinity of these plants and to any additional people who are exposed as a result of new construction.

Interested parties participated in the rulemaking by sending comments to EPA. The comments have been carefully considered, and where determined by the Administrator to be appropriate, changes have been made to the regulation as promulgated.

SUMMARY OF THE STANDARD

In ethylene dichloride-vinyl chloride plants, the standard limits vinyl chloride emissions from the ethylene dichloride and vinyl chloride formation and purification processes to 10 ppm. For the oxychlorination process, vinyl chloride emissions are limited to 0.2 g/kg of ethylene dichloride product.

In polyvinyl chloride plants, the standard limits vinyl chloride emissions from equipment preceding and including the stripper in the plant process flow to 10 ppm. Emissions from equipment following the stripper are to be controlled by stripping dispersion resins to 2000 ppm and other resins to 400 ppm, or by using equivalent controls. Vinyl chloride emissions from reactor opening are to be reduced to 0.02 g/kg polyvinyl chloride product.

In both ethylene dichloride-vinyl chloride and polyvinyl chloride plants, relief valve discharges and manual venting of gases are prohibited except under emergency conditions. Fugitive emissions are required to be captured and controlled.

HEALTH AND ENVIRONMENTAL IMPACTS

EPA prepared a document entitled the *Quantitative Risk Assessment for Community Exposure to Vinyl Chloride* which estimates the risk from vinyl chloride exposure to populations living in the vicinity of vinyl chloride-emitting plants before and after implementation of controls to meet the standard. There are no dose-response data for the concentrations of vinyl chloride found in the ambient air. Therefore, assessments of risk at ambient levels of exposure were extrapolated from dose-response data from higher levels of exposure using both a linear model and a log-probit model. Extrapolations made with each of these models entailed using different sets of assumptions. Because different assumptions can be made in extrapolating to low doses, the health risks are reported in ranges.

It was estimated that 4.6 million people live within 5 miles of ethylene dichoride-vinyl chloride and polyvinyl chloride plants and that the average exposure around these plants before installation of controls to meet the standard is 17 parts per billion. The exposure levels for uncontrolled plants were calculated based on estimated 1974 emission levels. Using the linear dose-response model, EPA found that the rate of initiation of liver angiosarcoma among people living around uncontrolled plants is expected to range from less than one to ten cases of liver angiosarcoma per year of exposure to vinyl chloride. The log-probit model gave predictions that are 0.1 to 0.01 times this rate. This wide range is an indication of the uncertainties in extrapolation to low doses. Due to the long latency time observed in cancer cases resulting from vinyl chloride exposure, increases initiated by exposure this year will not be diagnosed until the 1990's or later. Vinyl chloride is also estimated to produce an equal number of primary cancers at other sites, for a total of somewhere between less than one and twenty cases of cancer per year of exposure among residents around plants. The number of these effects is expected to be reduced at least in proportion to the reduction in the ambient annual average vinyl chloride concentration, which is expected to be 5 percent of the uncontrolled levels after the standard is implemented.

Changes in the standard since proposal do not affect the level of control required. Thus, the environmental impact of the promulgated standard is, with one exception, the same as that described in Chapter 6 of Volume I of the *Standard Support and Environmental Impact Statement*. According to data submitted by the Society of Plastics Industry, Inc. (SPI), the impact on water consumption in the draft environmental impact statement was overstated. In estimating the impact on water consumption, EPA based its estimates on worst case conditions. That is, EPA assumed that those control systems with the greatest water usage would be employed and that there would be no recycling of water. There is no regulation which would require water recycling. According to SPI, the control system utilizing the most water will not be used generally by the industry and economic factors will cause plants to recycle much of the water. Therefore, according to SPI the impact of the standard on water consumption will be negligible.

The environmental impacts of the promulgated standard may be summarized as follows: The primary environmental impacts of the standard are beneficial and will consist of vinyl chloride emission reductions of approximately 94 percent at ethylene dichloride-vinyl chloride plants and 95 percent at polyvinyl chloride plants. Percentage numbers for both source categories are based on an estimated 90 percent reduction in fugitive emissions and 1974 emission levels.

The potential secondary environmental impacts of the standard are either insignificant or will be minimized without additional action, except for one adverse impact. Hydrogen chloride is already emitted by process equipment at ethylene dichloride-vinyl chloride plants and by other petrochemical plants in the complexes where ethylene dichloride-vinyl chloride plants are typically located. An incinerator used to attain the standard at an ethylene dichloride-vinyl chloride plant could increase hydrogen chloride emissions by several fold. Typically, however, due to the corrosion problems which would otherwise occur both on plant property and in the community, plants use scrubbers to control already existing hydrogen chloride emissions. Hydrogen chloride emissions resulting from control of vinyl chloride emissions are expected to be controlled for the same reason. If even a moderately efficient scrubber (98 percent control) were used to control the hydrogen chloride emissions resulting from incineration of vinyl chloride emissions, the increase in hydrogen chloride emissions from a typical ethylene dichloride-vinyl chloride plant due to the standard would be reduced to 35 percent. However, EPA plans to further evaluate the need to control hydrogen chloride emissions, since diffusion model results indicate that under "worst-case" meteorological conditions, the hydrogen chloride emissions from the process equipment and the incinerator combined would cause maximum ambient concentrations of hydrogen chloride in the vicinity of ethylene dichloride-vinyl chloride plants to be in the same range or somewhat higher than existing foreign standards and National Academy of Sciences (NAS) guidelines for public exposure.

ECONOMIC IMPACT

In accordance with Executive Order 11821 and OMB circular A-107, EPA carefully evaluated the economic and inflationary impact of the proposed standard and alternative control levels and certified this in the preamble to the proposed standard. These impacts are discussed in Chapter 7 of Volume I of the *Standard Support and Environmental Impact Statement*. Comments on the proposed standard have resulted in only one major change in the economic impact analysis. EPA estimated that there would be four plant closures as a result of the promulgated standard. Of the four plants identified as possible closure candidates, one has given notice that it no longer produces polyvinyl chloride and the other three have indicated that they do not intend to close as a result of the standard.

The economic impacts of the promulgated standard may be summarized as follows: The total capital cost for existing plants to meet the standard is estimated to be $198 million, of which $15 million is for ethylene dichloride-vinyl chloride plants and $183 million is for polyvinyl chloride plants. EPA estimates that these plants will have to spend $70 million per year to maintain the required emission levels. In addition, the total capital cost for existing plants to meet the EPA's 1983 water effluent guideline limitations is expected to be $83 million and the total annualized operation cost is $17 million. The costs to the industry of meeting the OSHA standard cannot be quantified at this time, but they are expected to overlap to some degree with the costs to meet EPA's fugitive emission regulations. The costs of meeting the fugitive emission regulations are included in the total costs cited above for meeting the promulgated regulation. Broken out separately, the capital cost of meeting the fugitive emission regulations is $37 million and the annualized cost is $25 million.

The standard is not expected to deter construction of new ethylene dichloride-vinyl chloride plants or most types of new polyvinyl chloride plants. For one type of polyvinyl chloride plant (dispersion process) that represents 13 percent of the industry production, the standard would significantly deter the construction of smaller plants.

It is estimated that the price of polyvinyl chloride resins will rise by approximately 7.3 percent in order to maintain precontrol profitability and also to recover the total annualized control costs necessitated by the standard at ethylene dichloride-vinyl chloride plants and polyvinyl chloride plants. This increase is estimated to translate into a maximum consumer price increase in goods fabricated from polyvinyl chloride resins of approximately 3.5 percent. Recovery of effluent annualized costs plus maintenance of precontrol profitability is estimated to add approximately 2 percent to polyvinyl chloride resin prices and result in an additional maximum consumer price increase of 1 percent.

PUBLIC PARTICIPATION

During the public comment period, 50 comment letters on the proposed standard were received. There were 24 from industry; 3 from environmental groups; 15 from Federal, State, and local agencies; and 8 from individual citizens. As required by section 112(b) (1) (B) of the Act, a public hearing was held on the proposed standard on February 3, 1976, in Washington, D.C. Presentations were made by the Environmental Defense Fund, the Society of the Plastics Industry, Inc., Dow Chemical Company, Diamond Shamrock Corporation, and Air Products and Chemicals, Inc. Copies of the comment letters received, the public hearing record, and a summary of the comments with EPA's responses are available for public inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street, SW., Washington, D.C. In addition, copies of the comment summary and Agency responses may be obtained upon written request from the Public Information Center (PM-215), Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460 (specify *Standard Support and Environmental Impact Statement, Emission Standard for Vinyl Chloride, Volume II*).

SIGNIFICANT COMMENTS AND CHANGES TO THE PROPOSED REGULATION

(1) *Decision to list vinyl chloride as a hazardous air pollutant.* In general, the commenters did not contest EPA's decision to list vinyl chloride as a hazardous air pollutant. However, three commenters (two companies and one Federal agency) argued that EPA placed undue emphasis on factors suggesting that vinyl chloride presented a health risk and ignored factors suggesting that no significant risk was involved. Under section 112, however, EPA could remove vinyl chloride from the list of hazardous air pollutants only if information were presented to EPA that shows that vinyl chloride is clearly not a hazardous air pollutant. As discussed more fully in the comment summary, the commenters did not provide conclusive evidence that vinyl chloride is not a hazardous air pollutant which causes or contributes to death or serious illness, nor did they conclusively prove that the health risk factors emphasized by EPA were insignificant.

Several other commenters agreed with EPA's decision to list vinyl chloride as a hazardous air pollutant, but argued that EPA had overstated the health problem, the emission levels, and the projected ambient air concentrations around uncontrolled plants. With regard to the alleged overstated health problem, the commenters stated, for example, that the U.S. worker EPA discussed as having been exposed to vinyl chloride levels lower than those usually encountered in polyvinyl chloride production has been dropped from the National Institute of Occupational Safety and Health's listing of workers with angiosarcoma. EPA agrees that there are questions concerning the level of exposure and in some cases the pathology of these cases not involved directly in polyvinyl chloride and vinyl chloride production. These uncertainties are stated in the appropriate footnotes of the *Scientific and Technical Assessment Report on Vinyl Chloride and Polyvinyl Chloride* (STAR) where the angiosarcoma cases are listed. However, in spite of these uncertainties, in view of the possible exposure patterns, these cases cannot be ignored in the evaluation of the potential public health problems.

With regard to the alleged overstated emission levels, the uncontrolled emission levels reported by EPA were based on 1974 data. This qualification was stated wherever emission data were presented. EPA recognizes that emissions have been reduced since that time, and stated this in the preamble to the proposed standard. EPA decided not to gather more recent data on emission levels, because these emission levels are expected to change, and gathering the data would take considerable time both on the part of EPA and on the part of industry. Since the purpose of the standard is to minimize emissions, these more current data would not affect the standard itself. The 1974 emission levels were also used in diffusion modeling to project maximum ambient air concentrations around uncontrolled plants. These maximum air concentrations would probably be lower if 1976 emission levels were used. This would reduce the relative impact of the standard below that described in the *Standard Support and Environmental Impact Statement*, but would not affect the basis of the standard itself.

(2) *Approach for Regulating Vinyl Chloride Under Section 112.* Two approaches other than using best available control technology were suggested by the commenters for regulating vinyl chloride under section 112. The first was to ban polyvinyl chloride products for which substitutes are currently available and to gradually phase out other polyvinyl chloride products as substitutes are developed.

In the preamble to the proposed standard EPA specified its reasons for not setting a zero emission limit for vinyl chloride, as follows: (1) There are beneficial uses of vinyl chloride products for which desirable substitutes are not readily available; (2) there are potentially adverse health and environmental impacts from substitutes which have not been thoroughly studied; (3) there are a number of employees, particularly in the fabrication industries, who would become at least temporarily unemployed; and (4) control technology is available which is capable of substantially reducing emissions of vinyl chloride into the atmosphere.

EPA agrees that substitutes do exist or could be manufactured for most polyvinyl chloride uses. However, in general, these substitutes do not have some of the more desirable characteristics of polyvinyl chloride, such as nonflammability. If vinyl chloride and polyvinyl chloride were banned, other substitutes with these more desirable characteristics would likely be developed. There is a risk that these substitutes would also have adverse health or environmental effects. Since control measures are available which can reduce vinyl chloride emissions by 90 percent or more, it does not seem prudent to reduce emissions by the remaining percentage and take the risk of introducing new untested chemicals into the environment.

Another approach suggested by the commenters was to base the standard for each individual emission point on cost versus benefit. Several of the fugitive emission sources were named specifically as ones for which the costs of control were substantially higher than the benefits. Although EPA did determine a cost-benefit ratio for the controls required for a number of emission points, EPA does not believe such a ratio is an appropriate basis on which to set a standard. Section 111 of the Clean Air Act provides for the development of standards based on best control technology (considering costs). Even under section 111, however, standards are not based on a fine balancing of costs versus benefits. Instead, costs are considered in terms of the affordability of the control technology required to achieve a given emission level and the economic impact of possible standards on the industry in question. Unlike section 111, section 112 does not explicitly provide for consideration of costs, so it would clearly be inappropriate to consider costs to a greater extent under section 112 than would be done under section 111. As discussed in the preamble to the proposed standard for vinyl chloride, EPA believes costs may be considered under section 112, but only to a very limited extent; i.e., to assure that the costs of control technology are not grossly disproportionate to the amount of emission reduction achieved. In comparison with other emission points, the costs of controlling the fugitive emission sources mentioned by the commenters are relatively small compared with the amount of emission reduction achieved.

Several commenters recommended adding to the regulation a provision for excess emissions during startup, shutdown, and malfunction. EPA considered this comment, and decided that this addition is not necessary for the vinyl chloride standard. Startup and shutdown of the process has essentially no effect on emissions to the atmosphere for polyvinyl chloride production, and technology exists to avoid excess emissions during startup and shutdown at ethylene dichloridevinyl chloride plants. We do not believe plants should be allowed to emit excess emissions during malfunctions, and therefore are requiring them to shut down immediately.

(3) *Selection of source categories.* In the preamble to the proposed standard EPA recognized that some small research and development facilities may exist where the emissions of vinyl chloride are insignificant and covering these facilities under the standard would be unnecessary and inappropriate. However, EPA did not have sufficient information available to clearly define which facilities should be excluded from the standard, and encouraged interested parties to submit such information during the comment period. Based on the information submitted, EPA decided to exempt polyvinyl chloride reactors and associated equipment from applicability of all parts of the standard if the reactors are used in research and development and have a capacity of no more than 0.19 m^3 (50 gal). Reactors in this size range can generally be found in a laboratory, whereas the larger reactors are typically pilot scale facilities. Emissions from laboratory scale equipment are relatively small, and application of the controls required by the standard would be expensive and impractical. EPA also decided to exempt research and development facilities containing reactors greater than 0.19 m^3 (50 gal) and no more than 4.07 m^3 (1100 gal) in capacity from all parts of the standard except the 10 ppm limit for reactors, strippers, monomer recovery systems, and mixing, weighing and holding containers. EPA decided not to require these facilities to meet other parts of the standard because of the technical problems involved in doing so. For example, the standard for reactor opening is based in part on reducing the frequency of opening the reactor. Research and development reactors have to be opened after every batch for thorough cleaning. Also, stripping technology is developed individually for each resin in research and development equipment. Therefore, attainment of the stripping limitations in the research and development equipment would not always be possible. The 4.07 m^3 (1100 gal) figure was selected as an upper cut-off point because there are no commercial reactors smaller than this.

(4) *Emission limits.* The only major change in the emission limits between proposal and promulgation is the addition of a provision for emergency manual venting of vinyl chloride from reactors to the atmosphere. The proposed standard prohibited all manual venting to the atmosphere. In the preamble to the proposed standard, EPA invited interested persons to comment on whether permitting manual venting to the atmosphere could result in overall lower emissions. There are several methods available for preventing relief discharges from reactors, one of which is manual venting of part of the reactor contents for purposes of cooling and reduction in pressure within the reactor. The higher the temperature and pressure within the reactor, the greater the amount of vinyl chloride which has to be removed to bring the reactor under control. Manual venting can be done at a lower pressure than the pressure required to open the relief valve. For this reason manual venting can result in lower emissions than would occur by allowing the reactor to discharge through the relief valve. Furthermore, a manual vent valve is under the control of an operator and can be closed. A relief valve may become clogged with resin and not close. The result would be loss of all the reactor contents.

The contents of a reactor can be manually vented to a gasholder or other holding vessel. However, in some cases, such as during severe weather conditions, several reactors may be out of control at one time. There would be insufficient holding capacity under these conditions to manually vent the contents of all the reactors to a gasholder. Therefore, when all other measures to prevent relief valve discharges have been exhausted, manual venting will be permitted as a last resort before the relief valve opens. The same notification procedures are required for manual venting to the atmosphere as are required for relief discharges.

There are several changes in the numerical emission limits in the promulgated standard. Except for the standard for reactor opening loss, these changes simply involve conversion to the International System of Units (SI). There was an error involved in the original calculation used to derive the standard for reactor opening. Correcting this error doubles the allowable emissions. It is emphasized that the change in this standard is a correction, and not a change in the intent for the degree of control required.

The proposed standard required the installation of a rupture disc beneath each relief valve to prevent leakage from the relief valve. A provision has been added to the promulgated standard so that a rupture disc is not required if the relief valve is tied into a process line or recovery system. In this case, any leakage from the relief valve would be contained.

The regulation for obtaining vinyl chloride samples has been changed to an operating procedure. The proposed standard stated that there were to be no emissions from taking the samples. Several commenters pointed out that the use of the word "no" would make this regulation impractical to enforce. Therefore, the promulgated standard specifies the operating procedure which EPA originally intended to be used to control this source. This revision is only a change in wording and does not represent a change in the level of the standard.

The regulation for taking samples has also been revised to apply only to samples containing at least 10 percent by weight vinyl chloride. This is consistent with the other parts of the standard which apply to equipment "in vinyl chloride service." "In vinyl chloride service" distinguishes between situations where vinyl chloride is clearly involved and situations where vinyl chloride is a minor component or contaminant, and as defined in promulgated § 61.61(1) means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

The proposed standard required a vinyl chloride monitoring system for continuously measuring vinyl chloride levels both within the plant (for leak detection) and within stacks. The proposed standard did not outline required specifications for the monitoring system, except that it was to analyze the samples with gas chromatography, or if all hydrocarbons were assumed to be vinyl chloride, with infrared spectrophotometry, flame ion detection, or equivalent. It required that each plant submit a description of its monitoring system to EPA, so that EPA could determine whether it was acceptable or not. Comments were received indicating a need for EPA to specify some criteria for judging the acceptability of monitoring systems. The accuracy of the monitoring system would be related to the frequency of calibration. Therefore, EPA has included in the promulgated standard requirements for the frequency of calibration and procedures to be carried out in the calibration of the monitoring instruments.

The portable hydrocarbon detector required by the proposed standard was required to have a sensitivity of 5 ppm. Comments were received indicating that instruments in this sensitivity range are delicate and require continuing maintenance. The portable hydrocarbon detector is required for leak detection and for measuring vinyl chloride concentrations inside the equipment before opening it. A 5 ppm sensitivity is not needed in either case, and the required sensitivity has been changed to 10 ppm in the promulgated standard.

The proposed standard contained a single regulation for compressors. The promulgated standard has separate regulations for rotating and reciprocating compressors. This is consistent with having separate regulations for rotating and reciprocating pumps in both the proposed and promulgated standards.

Section 61.66 of the proposed standard provided for the use of equivalent methods of control which have been approved by EPA. The promulgated standard requires that the plant owner or operator submit a request for determination of equivalency within 30 days of the promulgation date if the alternative control method is intended as the initial means of control. The purpose of this is to provide time for EPA to evaluate the method before the plant has to be in compliance (for existing sources, 90 days after the promulgation date). EPA also suggests that this request for determination of equivalency be accompanied by a request for waiver of compliance pursuant to section 112(c)(1)(B)(ii) of the Act. The request for a waiver for compliance should provide for the case where EPA determines that a method is not equivalent and the plant needs to purchase other equipment. In no case will the waiver of compliance be extended beyond two years from the date of promulgation.

There are several wording clarifications which have been made in the promulgated standard. The definition for "in vinyl chloride service" (§ 60.61(1)) has been clarified by stating that it means equipment that contacts vinyl chloride as well as equipment that contains vinyl chloride. This would include such equipment as agitators.

Words have been added in §§ 61.62, 61.63, and 61.64 to clarify that the 10 ppm emission limits do not have to be met when equipment has already been opened in compliance with the regulation for opening of equipment. Equipment that has met the opening of equipment regulation can contain more than 10 ppm vinyl chloride and would be in violation of the standard if this statement were not included.

The requirements for stripping polyvinyl chloride resins to specified levels have been revised in §§ 61.64(e), 61.67(g)(3)(ii), and 61.70(c)(2)(i) so that measurement of the vinyl chloride levels in the resins is to be made immediately after stripping is completed rather than as the resin is being transferred out of the stripper. This allows a plant to carry out operations in a stripper after stripping has been completed but before it is transferred out of the stripper. This is consistent with the original intent of the standard.

The regulation for loading and unloading lines in § 61.65(b)(1) has been revised to clarify that it applies only to lines that are disconnected after each loading or unloading operation. Permanently installed pipelines that are opened infrequently for inspection or maintenance, for example, are covered by the opening of equipment regulation rather than the loading and unloading line regulation.

The regulation for inprocess wastewater in the proposed standard could have been misinterpreted to require individual treatment of wastewater streams. Section 61.65(b)(9)(i) of the promulgated standard clarifies that wastewater streams that are required to be treated (i.e., those containing greater than 10 ppm vinyl chloride) can be combined to be treated. However, wastewater streams that contain greater than 10 ppm vinyl chloride cannot be combined with wastewater streams that contain less than 10 ppm vinyl chloride before treatment; i.e., dilution cannot be used to meet the standard.

The commenters recommended several changes in the emission limits which have not been incorporated into the promulgated standard. These are discussed in the following paragraphs.

It was recommended that the requirement for double mechanical seals on pumps, compressors, and agitators be removed because the single seals currently used on this equipment have small emissions and are more reliable than double mechanical seals. EPA is aware that each fugitive emission source, such as one pump, taken by itself causes relatively small emissions. Fugitive emissions considered as a whole are a significant source of emissions, however, and the intent of the standard is to reduce these. Double mechanical seal pumps are commonly used in the industry for emission reduction. Sealless pumps or equivalent systems are available as options to double mechanical seals.

The commenters recommended increasing the averaging time for the 10 ppm limits and the emission limits for reactor opening and stripping to 30 days. Some of the commenters apparently thought that the 10 ppm limits had to be met on an instantaneous basis. However, since the performance test for determining compliance consists of three runs for a minimum of an hour each, the averaging time for the 10 ppm limit is at least three hours. Increasing the averaging time to 30 days for any of the emission limits would permit higher peak emission levels. EPA has determined that this is neither desirable nor necessary.

Some commenters requested that the stripping levels for dispersion resins be made the same as for other resins and others requested that they be made less stringent. EPA decided not to make the standard for stripping dispersion resins the same as for other resins because there is sufficient evidence to indicate that these resins are more difficult to strip than other resins. With regard to making the stripping levels for dispersion resins less stringent, only one of the eight manufacturers of dispersion resins specifically commented that the dispersion resin standard should be made less stringent. Only two of several grades of dispersion resins made by this company cannot meet the 2,000 ppm limit. The proposed standard takes into consideration that some resins are more difficult to strip than others by providing for averaging among different resins.

(5) *Testing, reporting, and recordkeeping.* There are several relatively minor changes in the testing, reporting, and recordkeeping requirements. A provision has been added to § 61.67 which requires that stack gas samples taken with Test Method 106 are to be analyzed within 24 hours. This is consistent with the requirements in the proposed Test Method 106. The promulgated standard also specifies that in averaging the results of the three runs required by Test Method 106, a time-weighted average is to be used.

One commenter requested that the oxygen content and moisture content be specified for the 10 ppm concentration standards. The proposed standard specified that the vinyl chloride concentration is to be corrected to 10 percent oxygen (wet basis) if combustion is used as the control measure. In the promulgated standard, this requirement has been expanded to all control measures.

A provision has been added to the promulgated standard which states that if a reactor is also used as a stripper, the reactor opening emissions may be determined immediately following the stripping operation. If a reactor is also used as a stripper, the resin is in the reactor when it is opened. This means that vinyl chloride in the resin which has already been stripped to acceptable levels can escape from the resin and become part of the reactor opening loss. It is EPA's intent that once a resin has been stripped to the required levels, that additional controls are not required. Under the new provision, vinyl chloride escaping from the resin after it has been stripped to acceptable levels is not counted as part of the reactor opening loss.

A section requiring continuous monitoring of stack emissions has been added to the promulgated standard. The continuous monitoring of stack emissions was required in the proposed standard. The addition of a specific paragraph for emission monitoring serves only to clarify the requirement.

The standard has been revised so that the initial report requires a "description" rather than a "detailed description" of the equipment used to control fugitive emissions. Several commenters pointed out that a detailed description would contain proprietary information. EPA agrees that a detailed description in the initial report is unnecessary. If additional information is needed, EPA can obtain it under section 114 of the Act and the plant can request confidential treatment in accordance with 40 CFR Part 2 for information it believes to be proprietary.

The proposed standard required that a semiannual report be submitted every 180 days. The promulgated standard specifies dates for the submittal of the reports. It also specifies that the first semiannual report does not have to be submitted until at least six months after the initial report is submitted.

The standard has been revised to eliminate the requirement to record the cause of any leak detected by the vinyl chloride detector, the action taken to repair the leak, and the amount of time required to repair the leak. EPA is concerned only that leaks are detected and repaired. That this has been done can be established by looking at the strip chart record of measurements made by the vinyl chloride detector. These records are still required for the portable hydrocarbon detector however.

Several commentators recommended that the companies be allowed an extra two weeks to submit to EPA data from the initial performance test. They also recommended that they submit the data by regular mail rather than registered mail. EPA has not adopted either of these recommendations. A source is supposed to be in compliance with the standard within 90 days of the promulgation of the standard. The standard requires that the emission tests be done within the 90 day period, and permits an extra 30 days for determination of results. The purpose of using registered mail is to document the fact that emission data have been sent and received. This way if the results are lost in the mail, there will be no question that they were sent.

(6) *Test method.* Test Method 106 has been changed to recognize that on a gas chromatograph equipped with a Chromosorb 102 column, acetaldehyde may interfere with the vinyl chloride peak. When a sample is expected to contain acetaldehyde, a secondary column as described in section 4.3.2 must be employed. Mass spectroscopy or another absolute analytical technique is required to confirm the vinyl chloride peak obtained with the gas chromatograph, only if peak resolution with the secondary column is not successful.

In section 4.1.4, aluminised Mylar bags can be substituted for Tedlar bags. EPA now has data to allow this substitution, provided that the samples are analysed within 24 hours of collection.

In section 5.1.3 of Test Method 106 the requirement to use "oxygen gas" has been replaced with "oxygen gas or air, as required by the detector." Several commentors stated that most gas chromatographs are designed to use hydrogen and air for their flame detectors. When used in this way, they are capable of detecting 0.5 ppm vinyl chloride in air. This is sensitive enough for monitoring the 10 ppm emission limits stipulated in the standard.

In section 6.4 of Test Method 106 the requirement for an automatic integrator has been replaced with a requirement for a disc integrator or planimeter for measuring peak area. This change is in response to a comment which states that automatic integrators are unnecessarily elaborate and expensive.

A new section 6.5 has been added to Test Method 106 which requires determination of the water vapor content of the sampling bag by measuring the ambient temperature and pressure near the bag. The vinyl chloride concentration of the bag can then be reported on a dry basis. A provision for checking the rigid container for leaks has been added to section 7.4 of Test Method 106.

The only change in Test Method 107 is the provision in Section 5.3.2 for use of Carbopak C as well as Carbopak A.

AUTHORITY: Section 112 of the Clean Air Act as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7; Section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); Section 301(a) of the Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1718 (42 U.S.C. 1857g(a)).

Dated: October 12, 1976.

JOHN QUARLES,
Acting Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows: The table of sections for Part 61 is amended by adding a list of sections for new Subpart F and Part 61 is amended by adding a new Subpart F reading as follows:

Subpart F—National Emission Standard for Vinyl Chloride

Sec.
61.60 Applicability.
61.61 Definitions.
61.62 Emission standard for ethylene dichloride plants.
61.63 Emission standard for vinyl chloride plants.
61.64 Emission standard for polyvinyl chloride plants.
61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.
61.66 Equivalent equipment and procedures.
61.67 Emission tests.
61.68 Emission monitoring.
61.69 Initial report.
61.70 Semiannual report.
61.71 Recordkeeping.

AUTHORITY: Section 112 of the Clean Air Act as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7); section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687, and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9); section 301(a) of the Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g(a)).

Subpart F—National Emission Standard for Vinyl Chloride

§ 61.60 Applicability.

(a) This subpart applies to plants which produce:

(1) Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

(2) Vinyl chloride by any process, and/or

(3) One or more polymers containing any fraction of polymerized vinyl chloride.

(b) This subpart does not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of no more than 0.19 m^3 (50 gal).

(c) Sections of this subpart other than § 61.64(a)(1), (b), (c), and (d) do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 0.19 m^3 (50 gal) and no more than 4.07 m^3 (1100 gal).

§ 61.61 Definitions.

Terms used in this subpart are defined in the Act, in subpart A of this part, or in this section as follows:

(a) "Ethylene dichloride plant" includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(b) "Vinyl chloride plant" includes any plant which produces vinyl chloride by any process.

(c) "Polyvinyl chloride plant" includes any plant where vinyl chloride alone or in combination with other materials is polymerized.

(d) "Slip gauge" means a gauge which has a probe that moves through the gas/liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

(e) "Type of resin" means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk, and solution processes.

(f) "Grade of resin" means the subdivision of resin classification which describes it as a unique resin, i.e., the most exact description of a resin with no further subdivision.

(g) "Dispersion resin" means a resin manufactured in such away as to form fluid dispersions when dispersed in a plasticizer or plasticizer/diluent mixtures.

(h) "Latex resin" means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is sold undried.

(i) "Bulk resin' 'means a resin which is produced by a polymerization process in which no water is used.

(j) "Inprocess wastewater" means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride or results from the production or use of any raw material, intermediate product, finished product, by-product, or waste product containing vinyl chloride or polyvinyl chloride but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(k) "Wastewater treatment process" includes any process which modifies characteristics such as BOD, COD, TSS, and pH, usually for the purpose of meeting effluent guidelines and standards; it does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of this subpart.

(l) "In vinyl chloride service" means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

(m) "Standard operating procedure" means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons resnonsible for carrying out the procedure.

(n) "Run" means the net period of time during which an emission sample is collected.

(o) "Ethylene dichloride purification" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(p) "Vinyl chloride purification" includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(q) "Reactor" includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(r) "Reactor opening loss" means the emissions of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge as defined in § 61.65(a).

(s) "Stripper" includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

§ 61.62 Emission standard for ethylene dichloride plants.

An owner or operator of an ethylene dichloride plant shall comply with the requirements of this section and § 61.65.

(a) Ethylene dichloride purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) before being opened.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from each oxychlorination reactor are not to exceed 0.2 g/kg the 100 percent ethylene dichloride product from the oxychlorination process.

§ 61.63 Emission standard for vinyl chloride plants.

An owner or operator of a vinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Vinyl chloride formation and purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) (6) (i) before being opened.

§ 61.64 Emission standard for polyvinyl chloride plants.

An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Reactor: The following requirements apply to reactors:

(1) The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each reactor is not to exceed 10 ppm, except as provided in paragraph (a)(2) of this section and § 61.65(a).

(2) The reactor opening loss from each reactor is not to exceed 0.02 g vinyl chloride/Kg (0.00002 lb vinyl chloride/lb) of polyvinyl chloride product, with the product determined on a dry solids basis. This requirement applies to any vessel which is used as a reactor or as both a reactor and a stripper. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

(3) Manual vent valve discharge: Except for an emergency manual vent valve discharge. there is to be no discharge to the atmosphere from any manual vent valve on a polyvinyl chloride reactor in vinyl chloride service. An emergency manual vent valve discharge means a discharge to the atmosphere which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any discharge to the atmosphere from any manual vent valve, the owner or operator of the source from which the discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Stripper: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) (6) (i) before being opened.

(c) Mixing, weighing, and holding containers: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper (or the reactor if the plant has no stripper) in the plant process flow is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) (6) (i) before being opened.

(d) Monomer recovery system. The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each monomer recovery system is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b) (6) (i) before being opened.

(e) Sources following the stripper(s): The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) [or the reactor(s) if the plant has no stripper(s)] in the plant process flow including but not limited to, centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and inprocess wastewater:

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed:

(i) 2000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(ii) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere may not exceed:

(i) 2 g/kg (0.002 lb/lb) product from the stripper(s) [or reactor(s) if the plant has no stripper(s)] for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(ii) 0.4 g/kg (0.0004 lb/lb) product from the strippers [or reactor(s) if the plant has no stripper(s)] for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this section.

(a) Relief valve discharge: Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. An emergency relief discharge means a discharge which could not have been avoided by taking measures to prevent the discharge. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Administrator a report in writing containing information on the source, nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(b) Fugitive emission sources:

(1) Loading and unloading lines: Vinyl chloride emissions from loading and unloading lines which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:

(i) After each loading or unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere is to be reduced so that the parts combined contain no greater than 0.0038 m³ (0.13 ft³) of vinyl chloride, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from a loading or unloading line in accordance with paragraph (b)(1)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(2) Slip gauges: During loading or unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service are to be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(3) Leakage from pump, compressor, and agitator seals:

(i) Rotating pumps: Vinyl chloride emissions from seals on all rotating pumps in vinyl chloride service are to be minimized by installing sealless pumps, pumps with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emission from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(ii) Reciprocating pumps: Vinyl chloride emissions from seals on all reciprocating pumps in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the pump; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iii) Rotating compressor: Vinyl chloride emissions from seals on all rotating compressors in vinyl chloride service are to be minimized by installing compressors with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(iv) Reciprocating compressors: Vinyl chloride emissions from seals on all reciprocating compressors in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in § 61.66. If double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(v) Agitator: Vinyl chloride emissions from seals on all agitators in vinyl chloride service are to be minimized by installing agitators with double mechanical seals, or equivalent as provided in § 61.66. If double mechanical seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the agitated vessel; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(4) Leakage from relief valves: Vinyl chloride emissions due to leakage from each relief valve on equipment in vinyl chloride service are to be minimized by installing a rupture disk between the equipment and the relief valve, by connecting the relief valve discharge to a process line or recovery system, or equivalent as provided in § 61.66.

(5) Manual venting of gases: Except as provided in § 61.64(a)(3), all gases which are manually vented from equipment in vinyl chloride service are to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm; or equivalent as provided in § 61.66.

(6) Opening of equipment: Vinyl chloride emissions from opening of equipment (including loading or unloading lines that are not opened to the atmosphere after each loading or unloading operation) are to be minimized as follows:

(i) Before opening any equipment for any reason, the quantity of vinyl chloride is to be reduced so that the equipment contains no more than 2.0 percent by volume vinyl chloride or 0.0950 m³ (25 gal) of vinyl chloride, whichever is larger, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from the equipment in accordance with paragraph (b)(6)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(7) Samples: Unused portions of samples containing at least 10 percent by weight vinyl chloride are to be returned to the process, and sampling techniques are to be such that sample containers in vinyl chloride service are purged into a closed process system.

(8) Leak detection and elimination: Vinyl chloride emissions due to leaks from equipment in vinyl chloride service are to be minimized by instituting and implementing a formal leak detection and elimination program. The owner or operator shall submit a description of the program to the Administrator for approval. The program is to be submitted within 45 days of the effective date of these regulations, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the program is to be submitted on a date scheduled by the Administrator. Approval of a program will be granted by the Administrator provided he finds:

(i) It includes a reliable and accurate vinyl chloride monitoring system for detection of major leaks and identification of the general area of the plant where a leak is located. A vinyl chloride monitoring system means a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry flame ion detection, or an equivalent or alternative method.

(ii) It includes a reliable and accurate portable hydrocarbon detector to be used routinely to find small leaks and to pinpoint the major leaks indicated by the vinyl chloride monitoring system. A portable hydrocarbon detector means a device which measures hydrocarbons with a sensitivity of at least 10 ppm and is of such design and size that it can be used to measure emissions from localized points.

(iii) It provides for an acceptable calibration and maintenance schedule for the vinyl chloride monitoring system and portable hydrocarbon detector. For the vinyl chloride monitoring system, a daily span check is to be conducted with a concentration of vinyl chloride equal to the concentration defined as a leak according to paragraph (b)(8)(vi) of this section. The calibration is to be done with either:

(A) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.3 of Test Method 106, or

(B) A calibration gas cylinder containing the appropriate concentration of vinyl chloride. If a calibration gas cylinder is used, the analysis must be traceable to the National Bureau of Standards or to a gravimetrically calibrated vinyl chloride permeation tube.

(iv) The location and number of points to be monitored and the frequency of monitoring provided for in the program are acceptable when they are compared with the number of pieces of equipment in vinyl chloride service and the size and physical layout of the plant.

(v) It contains an acceptable plan of action to be taken when a leak is detected.

(vi) It contains a definition of leak which is acceptable when compared with the background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system. Measurements of background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system are to be included with the description of the program. The definition of leak for a given plant may vary among the different areas within the plant and is also to change over time as background concentrations in the plant are reduced.

(9) Inprocess wastewater: Vinyl chloride emissions to the atmosphere from inprocess wastewater are to be reduced as follows:

(i) The concentration of vinyl chloride in each inprocess wastewater stream containing greater than 10 ppm vinyl chloride measured immediately as it leaves a piece of equipment and before being mixed with any other inprocess wastewater stream is to be reduced to no more than 10 ppm by weight before being mixed with any other inprocess wastewater stream which contains less than 10 ppm vinyl chloride; before being exposed to the atmosphere, before being discharged to a wastewater treatment process; or before being discharged untreated as a wastewater. The paragraph does apply to water which is used to displace vinyl chloride from equipment before it is opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section, but does not apply to water which is used to wash out equipment after the equipment has already been opened to the atmosphere in accordance with § 61.64(a)(2) or paragraph (b)(6) of this section.

(ii) Any vinyl chloride removed from the inprocess wastewater in accordance with paragraph (b)(9)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in § 61.66.

(c) The requirements in paragraphs (b)(1), (b)(2), (b)(5), (b)(6), (b)(7) and (b)(8) of this section are to be incorporated into a standard operating procedure, anr made available upon request for inspection by the Administrator. The standard operating procedure is to include provisions for measuring the vinyl chloride in equipment $\geq 4.75\ m^3$ 01250 gal in volume for which an emission limit is prescribed in § 61.65(b)(6)(i) prior to opening the equipment and using Test Method 106, a portable hydrocarbon detector, or an equivalent or alternative method. The method of measurement is to meet the requirements in § 61.67(g)(5)(i)(A) or (g)((5)(i)(B).

§ 61.66 Equivalent equipment and procedures.

Upon written application from an owner or operator, the Administrator may approve use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing vinyl chloride emissions to the atmosphere to those prescribed for compliance with a specific paragraph of this subpart. For an existing source, any request for using an equivalent method as the initial measure of control is to be submitted to the Administrator within 30 days of the effective date. For a new source, any request for using an equivalent method is to be submitted to the Administrator with the application for approval of construction or modification required by § 61.07.

§ 61.67 Emission tests.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator of a source to which this subpart applies shall test emissions from the source,

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date, or

(2) Within 90 days of startup in the case of a new source, initial startup of which occurs after the effective date.

(b) The owner or operator shall provide the Administrator at least 30 days prior notice of an emission test to afford the Administrator the opportunity to have an observer present during the test.

(c) Any emission test is to be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated and under other relevant conditions as may be specified by the Administrator based on representative performance of the source.

(d) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The average is to be computed on a time weighted basis.

(e) All samples are to be analyzed within 24 hours, and vinyl chloride emissions are to be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.

(f) The owner or operator shall retain at the plant and make available, upon request, for inspection by the Administrator, for a minimum of 2 years records of emission test results and other data needed to determine emissions.

(g) Unless otherwise specified, the owner or operator shall use test Test Methods in Appendix B to this part for each test as required by paragraphs (g)(1), (g)(2), (g)(3), (g)(4), and (g)(5) of this section, unless an equivalent method or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) Test Method 106 is to be used to determine the vinyl chloride emissions from any source for which an emission limit is prescribed in §§ 61.62(a) or (b) § 61.63(a), or §§ 61.64(a)(1), (b), (c), or (d), or from any control system to which reactor emissions are required to be ducted in § 61.64(a)(2) or to which fugitive emissions are required to be ducted in §§ 61.65(b)(1)(ii), (b)(2), (b)(5), (b)(6)(ii), or (b)(9)(ii).

(i) For each run, one sample is to be collected. The sampling site is to be at least two stack or duct diameters downstream and one half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. For a rectangular cross section an equivalent diameter is to be determined from the following equation:

$$\text{equivalent diameter} = 2\,\frac{(\text{length})\,(\text{width})}{\text{length} + \text{width}}$$

The sampling point in the duct is to be at the centroid of the cross section. The sample is to be extracted at a rate proportional to the gas velocity at the sampling point. The sample is to be taken over a minimum of one hour, and is to contain a minimum volume of 50 liters corrected to standard conditions.

(ii) For gas streams containing more than 10 percent oxygen, the concentration of vinyle chloride as determined by Test Method 106 is to be corrected to 10 percent oxygen for determination of emissions by using the following equation:

$$C_{b\,(\text{corrected})} = C_b \, \frac{10.9}{20.9 - \text{percent } O_2}$$

where:

$C_{b(\text{corrected})}$ = The concentration of vinyl chloride in the exhaust gases, corrected to 10 per-percent oxygen.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
20.9 = Percent oxygen in the ambient air at standard conditions.
10.9 = Percent oxygen in the ambient air at standard conditions, minus the 10 percent oxygen to which the correction is being made.
Percent O_2 = Percent oxygen in the exhaust gas as measured by Reference Method 3 in Appendix A of Part 60 of this chapter.

(iii) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions in kg/100 kg product are to be determined by using the following equation:

$$C_{BX} = \frac{[C_b \, (2.60) \, Q \, 10^{-6}] \, [100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.
C_b = The concentration of vinyl chloride as measured by Test Method 106.
2.60 = Density of vinyl chloride at one atmosphere and 20°C in kg/m³.
Q = Volumetric flow rate in m³/hr as determined by Reference Method 2 of Appendix A to Part 60 of this chapter.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr).

(2) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream for which an emission limit is prescribed in § 61.65(b) (9) (i).

(3) Where a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined using Test Method 107 as follows:

(i) The number of strippers and samples and the types and grades of resin to be sampled are to be determined by the Administrator for each individual plant at the time of the test based on the plant's operation.

(ii) Each sample is to be taken immediately following the stripping operation.

(iii) The corresponding quantity of material processed by each stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraph (g) (3) (i) of this section.

(4) Where control technology other than or in addition to a stripping operation is used to attain the emission limit in § 61.64(e), emissions are to be determined as follows:

(i) Test Method 106 is to be used to determine atmospheric emissions from all of the process equipment simultaneously. The requirements of paragraph (g) (1) of this section are to be met.

(ii) Test Method 107 is to be used to determine the concentration of vinyl chloride in each inprocess wastewater stream subject to the emission limit prescribed in § 61.64(e). The mass of vinyl chloride in kg/100 kg product in each in process wastewater stream is to be determined by using the following equation:

$$C_{BX} = \frac{[C_d \, R \, 10^{-6}] \, [100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.
C_d = the concentration of vinyl chloride as measured by Test Method 107.
R = water flow rate in l/hr, determined in accordance with a method which has been submitted to and approved by the Administrator.
10^{-6} = Conversion factor for ppm.
Z = Production rate (kg/hr), determined in accordance with a method which has been submitted and approved by the Administrator.

(5) The reactor opening loss for which an emission limit is prescribed in § 61.64 (a) (2) is to be determined. The number of reactors for which the determination is to be made is to be specified by the Administrator for each individual plant at the time of the determination based on the plant's operation. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

(i) Except as provided in paragraph (g) (5) (ii) of this section, the reactor opening loss is to be determined using the following equation:

$$C = \frac{W \, (2.60) \, (10^{-6}) \, (Cb)}{YZ}$$

where:

C = kg vinyl chloride emissions/kg product.
W = Capacity of the reactor in m³.
2.60 = Density of vinyl chloride at one atmosphere and 20° C in kg/m³.
10^{-6} = Conversion factor for ppm.
Cb = ppm by volume vinyl chloride as determined by Test Method 106 or a portable hydrocarbon detector which measures hydrocarbons with a sensitivity of at least 10 ppm.
Y = Number of batches since the reactor was last opened to the atmosphere.
Z = Average kg of polyvinyl chloride produced per batch in the number of batches since the reactor was last opened to the atmosphere.

(A) If Method 106 is used to determine the concentration of vinyl chloride (Cb), the sample is to be withdrawn at a constant rate with a probe of sufficient length to reach the vessel bottom from the manhole. Samples are to be taken for 5 minutes within 6 inches of the vessel bottom, 5 minutes near the vessel center, and 5 minutes near the vessel top.

(B) If a portable hydrocarbon detector is used to determine the concentration of vinyl chloride (Cb), a probe of sufficient length to reach the vessel bottom from the manhole is to be used to make the measurements. One measurement will be made within 6 inches of the vessel bottom, one near the vessel center and one near the vessel top. Measurements are to be made at each location until the reading is stabilized. All hydrocarbons measured are to be assumed to be vinyl chloride.

(C) The production rate of polyvinyl chloride (Z) is to be determined by a method submitted to and approved by the Administrator.

(ii) A calculation based on the number of evacuations, the vacuum involved, and the volume of gas in the reactor is hereby approved by the Administrator as an alternative method for determining reactor opening loss for postpolymerization reactors in the manufacture of bulk resins.

§ 61.68 Emisison monitoring.

(a) A vinyle chloride monitoring system is to be used to monitor on a continuous basis the emissions from the sources for which emission limits are prescribed in § 61.62(a) and (b), § 61.63(a), and § 61.64(a) (1), (b), (c), and (d), and for any control system to which reactor emission are required to be ducted in § 61.65(b) (1) (ii), and (b) (2), (b) (5), (b) (6) (ii), and (b) (9) (ii).

(b) The vinyl chloride monitoring system(s) used to meet the requirement in paragraph (a) of this section is to be a device which obtains air sampels from one or more points on a continuous sequential basis and analyzes the samples with gas chromotography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry, flame ion detection, or an equivalent or alternative method. The vinyl chloride monitoring system used to meet the requirements in § 61.65(b) (8) (i) may be used to meet the requirements of this section.

(c) A daily span check is to be conducted for each vinyle chloride monitoring system used. For all of the emission sources listed in paragraph (a) of this section, except the one for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride equal to 10 ppm. For the emission source for which an emission limit is prescribed in § 61.62(b), the daily span check is to be conducted with a concentration of vinyl chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by § 67.67. The calibration is to be done with either:

(1) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.3 of Test Method 106, or

(2) A calibration gas cylinder containing the appropriate concentration of vinyl chloride. If a calibration gas cylinder is used, the analysis must be traceable to the National Bureau of Standards or to a gravimetrically calibrated vinyl chloride permeation tube.

§ 61.69 Initial report.

(a) An owner or operator of any source to which this subpart applies shall submit a statement in writing notifying the Administrator that the equipment and procedural specifications in §§ 61.65 (b) (1), (b) (2), (b) (3), (b) (4), (b) (5), (b) (6), (b) (7), and (b) (8) are being implemented.

(b) (1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the effective date, unless a waiver of compliance is granted under § 61.11, along with the information required under § 61.10. If a waiver of compliance is granted, the statement is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the initial startup date.

(c) The statement is to contain the following information:

(1) A list of the equipment installed for compliance,

(2) A description of the physical and functional characteristics of each piece of equipment,

(3) A description of the methods which have been incorporated into the standard operating procedures for measuring or calculating the emissions for which emission limits are prescribed in §§ 61.65 (b) (1) (i) and (b) (6) (i),

(4) A statement that each piece of equipment is installed and that each piece of equipment and each procedure is being used.

§ 61.70 Semiannual report.

(a) (2) is to be determined. The number source to which this subpart applies shall submit to the Administrator on September 15 and March 15 of each year a report in writing containing the information required by this section. The first semi-annual report is to be submitted following the first full 6 month reporting period after the initial report is submitted.

(b) (1) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the effective date, unless a waiver of compliance is granted under § 61.11. If a waiver of compliance is granted, the first report is to be submitted on a date scheduled by the Administrator.

(2) In the case of a new source which did not have an initial startup date preceding the effective date, the first report is to be submitted within 180 days of the initial startup date.

(c) Unless otherwise specified, the owner or operator shall use the Test Methods in Appendix B to this part to conduct emission tests as required by paragraphs (c) (2) and (c) (3) of this section, unless an equivalent or an alternative method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) The owner or operator shall include in the report a record of any emissions which averaged over any hour period (commencing on the hour) are in excess of the emission limits prescribed in §§ 61.62(a) or (b), § 61.63(a), or §§ 61.64(a) (1), (b), (c), or (d), or for any control system to which reactor emissions are required to be ducted in § 61.64(a) (2) or to which fugitive emissions are required to be ducted in § 61.65 (b) (1) (ii), (b) (2), (b) (5), (b) (6) (ii), or (b) (9) (ii). The emissions are to be measured in accordance with § 61.68.

(2) In polyvinyl chloride plants for which a stripping operation is used to attain the emisison level prescribed in § 61.64(e), the owner or operator shall include in the report a record of the vinyl chloride content in the polyvinyl chloride resin. Test Method 107 is to be used to determine vinyl chloride content as follows:

(i) If batch stripping is used, one representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping, and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.

(ii) If continuous stripping is used, one representative sample of polyvinyl chloride resin is to be taken for each grade of resin processed or at intervals of 8 hours for each grade of resin which is being processed, whichever is more frequent. The sample is to be taken as the resin flows out of the stripper and identified by resin type and grade and the date and time the sample was taken. The corresponding quantity of material processed by each stripper over the time period represented by the sample during the eight hour period, is to be recorded and identified by resin type and grade and the date and time it represents.

(iii) The quantity of material processed by the stripper is to be determined on a dry solids basis and by a method submitted to and approved by the Administrator.

(iv) At the prior request of the Administrator, the owner or operator shall provide duplicates of the samples required in paragraphs (c) (2) (i) and (c) (2) (ii) of this section.

(v) The report to the Administrator by the owner or operator is to include the vinyl chloride content found in all the samples required in paragraphs (c) (2) (i) and (c) (2) (ii) of this section, averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper(s) that calendar day, according to the following equation:

$$A_{T_j}=\frac{\sum_{i=1}^{n} P_{G_i} M_{G_i}}{Q_{T_j}}$$

$$=\frac{P_{G_1} M_{G_1}+P_{G_2} M_{G_2}+\dots+P_{G_n} M_{G_n}}{Q_{T_j}}$$

A=24-hour average concentration of type T_j resin in ppm.
Q=Total production of type T_j resin over the 24-hour period, in kg.
T_j=Type of resin; $j=1,2, \dots m$ where m is total number of resin types produced during the 24-hour period.
M=Concentration of vinyl chloride in one sample of grade G_i resin, in ppm.
P=Production of grade G_i resin represented by the sample, in kg.
G_i=Grade of resin, e.g., G_1, G_2, and G_3.
n=Total number of grades of resin produced during the 24-hour period.

(vi) The owner or operator shall retain at the source and make available for inspection by the Administrator for a minimum of 2 years records of all data needed to furnish the information required by paragraph (c) (2) (v) of this section: The records are to contain the following information:

(A) The vinyl chloride content found in all the samples required in paragraphs (c) (2) (i) and (c) (2) (ii) of this section, identified by the resin type and grade and the time and date of the sample, and

(B) The corresponding quantity of polyvinyl chloride resin processed by the stripper(s), identified by the resin type and grade and the time and date it represents.

(3) The owner or operator shall include in the report a record of the emissions from each reactor opening for which an emission limit is prescribed in § 61.64(a) (2). Emissions are to be determined in accordance with § 61.67(g) (5), except that emissions for each reactor are to be determined. For a reactor that is also used as a stripper, the determination may be made immediately following the stripping operation.

§ 61.71 Recordkeeping.

(a) The owner or operator of any source to which this subpart applies shall retain the following information at the source and make it available for inspection by the Administrator for a minimum of two years;

(1) A record of the leaks detected by the vinyl chloride monitoring system, as required by § 61.65(b) (8), including the concentrations of vinyl chloride as measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by § 61.65(b) (8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak and any action taken to eliminate that leak measured in accordance with § 61.68.

(3) For the relief discharges from reactors subject to the provisions of § 61.65(a), a daily operating record for each reactor, including pressures and temperatures.

2. Appendix B is amended by adding Test Methods 106 and 107 as follows:

METHOD 106—DETERMINATION OF VINYL CHLORIDE FROM STATIONARY SOURCES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 An integrated bag sample of stack gas containing vinyl chloride (chloroethylene) is subjected to chromatographic analysis, using a flame ionization detector.

1.2 The method is applicable to the measurement of vinyl chloride in stack gases from ethylene dichloride, vinyl chloride and polyvinyl chloride manufacturing processes, except where the vinyl chloride is contained in particulate matter.

2. Range and Sensitivity.

The lower limit of detection will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg.

3. Interferences.

Acetaldehyde, which can occur in some vinyl chloride sources, will interfere with the vinyl chloride peak from the Chromosorb 102 column. See sections 4.3.2 and 6.4. If resolution of the vinyl chloride peak is still not satisfactory for a particular sample, then chromatograph parameters can be further altered with prior approval of the Administrator. If alteration of the chromatograph parameters fails to resolve the vinyl chloride peak, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, must be performed.

4. Apparatus.

4.1 Sampling (Figure 1).

4.1.1 Probe—Stainless steel, Pyrex glass, or Teflon tubing according to stack temperature, each equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample line—Teflon, 6.4 mm outside diameter, of sufficient length to connect probe to bag. A new unused piece is employed for each series of bag samples that constitutes an emission test.

4.1.3 Male (2) and female (2) stainless steel quick-connects, with ball checks (one pair without) located as shown in Figure 1.

4.1.4 Tedlar bags, 100 liter capacity—To contain sample. Teflon bags are not acceptable. Aluminized Mylar bags may be used, provided that the samples are analyzed within 24 hours of collection.

4.1.5 Rigid leakproof containers for 4.1.4, with covering to protect contents from sunlight.

4.1.6 Needle valve—To adjust sample flow rate.

4.1.7 Pump—Leak-free. Minimum capacity 2 liters per minute.

4.1.8 Charcoal tube—To prevent admission of vinyl chloride to atmosphere in vicinity of samplers.

4.1.9 Flow meter—For observing sample flow rate; capable of measuring a flow range from 0.10 to 1.00 liter per minute.

4.1.10 Connecting tubing—Teflon, 6.4 mm outside diameter, to assemble sample train (Figure 1).

4.1.11 Pitot tube—Type S (or equivalent), attached to the probe so that the sampling flow rate can be regulated proportional to the stack gas velocity.

4.2 Sample recovery.

4.2.1 Tubing—Teflon, 6.4 mm outside diameter, to connect bag to gas chromatograph sample loop. A new unused piece is employed for each series of bag samples that constitutes an emission test, and is to be discarded upon conclusion of analysis of those bags.

4.3 Analysis.

4.3.1 Gas chromatograph—With flame ionization detector, potentiometric strip chart recorder and 1.0 to 5.0 ml heated sampling loop in automatic sample valve.

4.3.2 Chromatographic column—Stainless steel, 2.0 × 3.2 mm, containing 80/100 mesh Chromosorb 102. A secondary colum of GE SF-96, 20% on 60/80 mesh AW Chromosorb P, stainless steel, 2.0 m × 3.2 mm, will be required if acetaldehyde is present. If used, the SF-96 column is placed after the Chromosorb 102 column. The combined columns should then be operated at 110°C.

4.3.3 Flow meters (2)—Rotameter type, 0 to 100 ml/min capacity, with flow control valves.

4.3.4 Gas regulators—For required gas cylinders.

4.3 5 Thermometer—Accurate to one degree centigrade, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer—Accurate to 5 mm Hg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump—Leak-free. Minimum capacity 100 ml/min.

4.4 Calibration.

4.4.1 Tubing—Teflon, 6.4 mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar bags—Sixteen-inch square size, separate bag marked for each calibration concentration.

4.4.3 Syringe—0.5 ml, gas tight.

4.4.4 Syringe—50µl, gas tight.

4.4.5 Flow meter—Rotameter type, 0 to 1000 ml/min range accurate to ±1%, to meter nitrogen in preparation of standard gas mixtures.

4.4.6 Stop watch—Of known accuracy, to time gas flow in preparation of standard gas mixtures.

5. Reagents. It is necessary that all reagents be of chromatographic grade.

5.1 Analysis.

5.1.1 Helium gas or nitrogen gas—Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen gas—Zero grade.

5.1.3 Oxygen gas, or Air, as required by the detector—Zero grade.

5.2 Calibration.

5.2.1 Vinyl chloride, 99.9+%—For preparation of standard gas mixtures.

5.2.2 Calibration cylinders (3), optional—One each of 50, 10 and 5 ppm vinyl chloride in nitrogen with certified analysis. Analysis must be traceable to NBS (National Bureau of Standards) or to a gravimetrically calibrated vinyl chloride permeation tube.

5.2.3 Nitrogen gas—Zero grade, for preparation of standard gas mixtures.

6. Procedure.

6.1 Sampling. Assemble the sample train as in Figure 106-1. Perform a bag leak check according to Section 7.4. Observe that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle valve adjusted to yield a flow of 0.5 lpm. After a period of time sufficient to purge the line several times has elapsed, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate proportional to the stack velocity. Direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect the bag container from sunlight.

6.2 Sample storage. Sample bags must be kept out of direct sunlight. When at all possible, analysis is to be performed within 24 hours of sample collection.

6.3 Sample recovery. With a piece of Teflon tubing identified for that bag, connect a bag inlet valve to the gas chromatograph sample valve. Switch the valve to withdraw gas from the bag through the sample loop. Plumb the equipment so the sample gas passes from the sample valve to the leak-free pump, and then to a charcoal tube, followed by a 0–100 ml/min rotameter with flow control valve.

6.4 Analysis. Set the column temperature to 100° C the detector temperature to 150° C, and the sample loop temperature to 70° C. When optimum hydrogen and oxygen flow rates have been determined verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 40 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base line drift has ceased. Purge the sample loop for thirty seconds at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed and the attenuator setting. Record the laboratory pressure. From the chart, select the peak having the retention time corresponding to vinyl chloride, as determined in Section 7.2. Measure the peak area, A_m, by use of H_m, and a disc integrator or a planimeter. Measure the peak height, H_m. Record A_m and the retention time. Repeat the injection at least two times or until two consecutive vinyl chloride peaks do not vary in area more than 5%. The average value for these two areas will be used to compute the bag concentration.

Compare the ratio of H_m to A_m for the vinyl chloride sample with the same ratio for the standard peak which is closest in height. As a guideline, if these ratios differ by more than 10%, the vinyl chloride peak may not be pure (possibly acetaldehyde is present) and the secondary column should be employed (see Section 4.3.2).

6.5 Measure the ambient temperature and barometric pressure near the bag. (Assume the relative humidity to be 100 percent.) From a water saturation vapor pressure table, determine the record and water vapor content of the bag.

7. Calibration and Standards.

7.1 Preparation of vinyl chloride standard gas mixtures. Evacuate a sixteen-inch square Tedlar bag that has passed a leak check (described in Section 7.4) and meter in 5.0 liters of nitrogen. While the bag is filling, use the 0.5 ml syringe to inject 250µl of 99.9+% vinyl chloride through the wall of the bag. Upon withdrawing the syringe needle, immediately cover the resulting hole with a piece of adhesive tape. This gives a concentration of 50 ppm of vinyl chloride. In a like manner use the other syringe to prepare dilutions having 10 and 5 ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases.

7.2 Determination of vinyl chloride retention time. This section can be performed simultaneously with Section 7.3. Establish chromatograph conditions identical with those in Section 6.3, above. Set attenuator to X 1 position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column temperature, the carrier gas flow rate, the chart speed and the attenuator setting. Record peaks and detector responses that occur in the absence of vinyl chloride. Maintain conditions. With the equipment plumbing arranged identically to Section 6.3, flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the vinyl chloride calibration mixtures and activate the sample valve. Record the injection time. Select the peak that corresponds to vinyl chloride. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This quantity, divided by the chart speed, is defined as the retention time. Record.

7.3 Preparation of chromatograph calibration curve. Make a gas chromatographic measurement of each standard gas mixture (described in Section 7.1) using conditions identical with those listed in Section 6.3 above. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with each standard gas mixture and activate the sample valve. Record C_c, the concentrations of vinyl chloride injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multi-

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

plied by the attenuator setting. Repeat until two injection areas are within 5%, then plot those points vs C_c. When the other concentrations have been plotted, draw a smooth curve through the points. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.4 Bag leak checks. While performance of this section is required subsequent to bag use, it is also advised that it be performed prior to bag use. After each use, make sure a bag did not develop leaks as follows. To leak check, connect a water manometer and pressurize the bag to 5–10 cm H_2O (2–4 in H_2O). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. Also check the rigid container for leaks in this manner.

(NOTE: An alternative leak check method is to pressurize the bag to 5–10 cm H_2O or 2–4 in. H_2O and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in-line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. Calculations.

8.1 Determine the sample peak area as follows:

$$A_s = A_m A_f$$

Equation 106–1

where:

A_s=The sample peak area.

A_m=The measured peak area.

A_f=The attenuation factor.

8.2 Vinyl chloride concentrations. From the calibration curve described in Section 7.3, above, select the value of C_c that corresponds to A_s, the sample peak area. Calculate C_b as follows:

$$C_b = \frac{C_c P_r T_i}{P_i T_r (1 - B_{wb})}$$

Equation 106–2

Where:

B_{wb}=The water vapor content of the bag samble, as analyzed.

C_b=The concentration of vinyl chloride in the bag sample in ppm.

C_c=The concentration of vinyl chloride indicated by the gas chromatograph, in ppm.

P_r=The reference pressure, the laboratory pressure recorded during calibration, mm Hg.

T_i=The sample loop temperature on the absolute scale at the time of analysis, °K.

P_i=The laboratory pressure at time of analysis, mm Hg.

T_r=The reference temperature, the sample loop temperature recorded during calibration, °K.

9. References.

1. Brown, D. W., Loy, E. W. and Stephenson, M. H. "Vinyl Chloride Monitoring Near the B. F. Goodrich Chemical Company in Louisville, Kentucky." Region IV, U.S. Environmental Protection Agency, Surveillance and Analysis Division, Athens, Georgia, June 24, 1974.

2. "Evaluation of A Collection and Analytical Procedure for Vinyl Chloride in Air," by G. D. Clayton and Associates, December 13, 1974. EPA Contract No. 68–02–1408, Task Order No. 2, EPA Report oN. 75–VCL–1.

3. "Standardization of Stationary Source Emission Method for Vinyl Chloride," by Midwest Research Institute, 1976. EPA Contract No. 68–02–1098, Task Order No. 7.

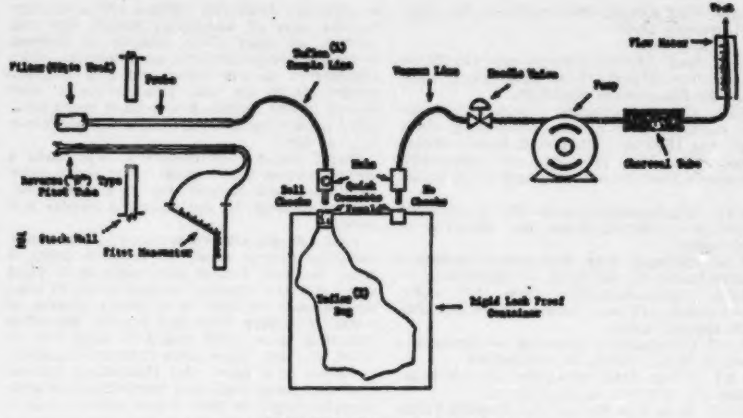

Figure 106-1. Integrated bag sampling train.

(1) Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

METHOD 107—DETERMINATION OF VINYL CHLORIDE CONTENT OF INPROCESS WASTEWATER SAMPLES, AND VINYL CHLORIDE CONTENT OF POLYVINYL CHLORIDE RESIN, SLURRY, WET CAKE, AND LATEX SAMPLES

INTRODUCTION

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with sampling, as there are many details that are beyond the scope of this presentation. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. Principle and Applicability.

1.1 The basis for this method relates to the vapor equilibrium which is established between RVCM, PVC, resin, water, and air in a closed system. It has been demonstrated that the RVCM in a PVC resin will equilibrate in a closed vessel quite rapidly, provided that the temperature of the PVC resin is maintained above the glass transition temperature of that specific resin.

1.2 This procedure is suitable for determining the vinyl chloride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused form, such as sheet or cubes. If a resolution of the vinyl chloride peak is not satisfactory for a particular sample, then chromatograph parameters may be altered with prior approval of the Administrator. If there is reason to believe that some other hydrocarbon with an identical retention time is present in the sample, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, should be performed.

2. Range and Sensitivity.

The lower limit of detection of vinyl chloride will vary according to the chromatograph used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg. With proper calibration, the upper limit may be extended as needed.

3. Precision and Reproducibility.

An interlaboratory comparison between seven laboratories of three resin samples, each split into three parts, yielded a standard deviation of 2.63% for a sample with a mean of 2.09 ppm, 4.16% for a sample with a mean of 1.66 ppm, and 5.29% for a sample with a mean of 62.66 ppm.

4. Safety.

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with VCM/air mixtures must be held to a minimum. When they are required, the vapor must be routed to outside air. Vinyl chloride, even at low ppm levels, must never be vented inside the laboratory. After vials have been analyzed, the pressure within the vial must be vented prior to removal from the instrument turntable. Vials must be vented into an activated charcoal tube using a hypodermic needle to prevent release of vinyl chloride into the laboratory atmosphere. The charcoal must be replaced prior to vinyl chloride breakthrough.

5. Apparatus.

5.1 Sampling.

5.1.1 Bottles—60 ml (2 oz), with waxed lined screw on tops, for PVC samples.

5.1.2 Vials—50 ml Hypo-vials,[1] sealed with Teflon faced Tuf-Bond discs for water samples.

5.1.3 Electrical tape—or equivalent, to prevent loosening of bottle tops.

5.2 Sample recovery.

5.2.1 Vials—With seals and caps, Perkin-Elmer Corporation No. 105–0118, or equivalent.

5.2.2 Analytical balance—Capable of weighing to ±0.001 gram.

5.2.3. Syringe, 100 µl—Precision Series "A" No. 010025, or equivalent.

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[1] Mention of trade names on specific products does not constitute endorsement by the Environmental Protection Agency.

5.2.4 Vial Sealer, Perkin-Elmer No. 105-0106 or equivalent.

5.3 Analysis.

5.3.1 Gas chromatograph—Perkin-Elmer Corporation Model F-40 head-space analyser, No. 104-0001, or equivalent.

5.3.2 Chromatographic column—Stainless steel, 2 m×3.2 mm, containing 0.4% Carbowax 1500 on Carbopak A, Perkin-Elmer Corporation No. 105-0133, or equivalent. Carbopak C can be used in place of Carbopak A.

5.3.3 Thermometer—0 to 100° C, accurate to ±0.1° C, Perkin-Elmer No. 105-0109 or equivalent.

5.3.4. Sample tray thermostat system—Perkin-Elmer No. 105-0103, or equivalent.

5.3.5 Septa—Sandwich type, for automatic dosing, 13 mm, Perkin-Elmer No. 105-1006, or equivalent.

5.3.6 Integrator - recorder — Hewlett - Packard Model 3380A, or equivalent.

5.3.7 Filter drier assembly (3)—Perkin-Elmer No. 2230117, or equivalent.

5.3.8 Soap film flowmeter—Hewlett Packard No. 0101-0113, or equivalent.

5.4 Calibration.

5.4.1 Regulators—for required gas cylinders.

6. Reagents.

6.1 Analysis.

6.1.1 Hydrogen gas—zero grade.

6.1.2 Nitrogen gas—zero grade.

6.1.3 Air—zero grade.

6.2 Calibration.

6.2.1 Standard cylinders (4)—one each of 50, 500, 2000, and 4000 ppm vinyl chloride in nitrogen, with certified analysis.

7. Procedure.

7.1 Sampling.

7.1.1 PVC sampling—Allow the resin or slurry to flow from a tap on the tank or silo until the tap line has been well purged. Extend a 60 ml sample bottle under the tap, fill, and immediately tightly cap the bottle. Wrap electrical tape around the cap and bottle to prevent the top from loosening. Place an identifying label on each bottle, and record the date, time, and sample location both on the bottles and in a log book.

7.1.2 Water sampling—Prior to use, the 50 ml vials (without the discs) must be capped with aluminum foil and muffled at 400°C for at least one hour to destroy or remove any organic matter that could interfere with analysis. At the sampling location fill the vials bubble-free, to overflowing so that a convex meniscus forms at the top. The excess water is displaced as the sealing disc is carefully placed, Teflon side down, on the opening of the vial. Place the aluminum seal over the disc and the neck of the vial and crimp into place. Affix an identifying label on the bottle, and record the date, time, and sample location both on the vials and in a log book. All samples must be kept refrigerated until analyzed.

7.2 Sample recovery. Samples must be run within 24 hours.

7.2.1 Resin samples—The weight of the resin used must be between 0.1 and 4.5 grams. An exact weight must be obtained (±0.001 gram) for each sample. In the case of suspension resins a volumetric cup can be prepared which will hold the required amount of sample. The sample bottle is opened, and the cup volume of resin is added to the tared sample vial (including septum and aluminum cap). The vial is immediately sealed and the exact sample weight is then obtained. Report this value on the data sheet as it is required for calculation of RVCM. In the case of relatively dry resin samples (water content <0.3 weight %), 100 µl of distilled water must be injected into the vial, after sealing and weighing, using a 100 µl syringe. In the case of dispersion resins, the cup cannot be used. The sample is instead weighed approximately in an aluminum dish, transferred to the tared vial and weighed accurately in the vial. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C.

NOTE: Some aluminum vial caps have a center section which must be removed prior to placing into sample tray. If not removed, serious damage to the injection needle will occur.

7.2.2 Suspension resin slurry and wet cake samples—Slurry must be filtered using a small Buchner funnel with vacuum to yield wet cake. The filtering process must be continued only as long as a steady stream of water is exiting from the funnel. Excessive filtration time could result in some loss of VCM. The wet cake sample (0.10 to 4.5 grams) is added to a tared vial (including septum and aluminum cap) and immediately sealed. Sample weight is then determined to 3 decimal places. The sample is then placed in the Perkin-Elmer head space analyzer (or equivalent) and conditioned for one hour at 90°C. A sample of wet cake is used to determine TS (total solids). This is required for calculating the RVCM.

7.2.3 Dispersion resin slurry samples.—This material should not be filtered. Sample must be thoroughly mixed. Using a tared vial (including septum and aluminum cap) add approximately 8 drops (0.25 to 0.35 grams) of slurry or latex using a medicine dropper. This should be done immediately after mixing. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 grams. Total sample weight must not exceed 0.50 grams. Condition the vial for one hour at 90°C in the analyzer. Determine the TS on the slurry sample (Section 7.3.5).

7.2.4 Inprocess wastewater samples—Using a tared vial (including septum and aluminum cap) quickly add approximately 1 cc of water using a medicine dropper. Seal the vial as soon as possible. Determine sample weight accurate to 0.001 gram. Condition the vial for two hours at 90°C in the analyzer.

7.3 Analysis.

7.3.1 Preparation of gas chromatograph—Install the chromatographic column and condition overnight at 150°C. Do not connect the exit end of the column to the detector while conditioning.

7.3.1.1 Flow rate adjustments—Adjust flow rates as follows:

a. Nitrogen carrier gas—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to 1.3 kg/cm². Normal flows at this pressure should be 25 to 40 cc/minute. Check with bubble flow meter.

b. Burner air supply—Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to supply air to burner at a rate between 250 and 300 cc/minute. Check with bubble flowmeter.

3. Hydrogen-supply—Set regulator on cylinder to read 30 psig. Set regulator on chromatograph to supply approximately 35±5 cc/minute. Optimize hydrogen flow to yield the most sensitive detector response without extinguishing the flame. Check flow with bubble meter and record this flow

7.3.1.2 Temperature adjustments—Set temperatures as follows:

a. Oven (chromatographic column), 50° C.

b. Dosing line, 140° C.

c. Injection block, 140° C.

d. Sample chamber, water temperature, 90° C±1.0° C.

7.3.1.3 Ignition of flame ionization detector—Ignite the detector according to the manufacturer's instructions.

7.3.1.4 Amplifier balance—Balance the amplifier according to the manufacturer's instructions.

7.3.2 Programming the chromatograph—Program the chromatograph as follows:

a. I—Dosing time—The normal setting is 2 seconds.

b. A—Analysis time—The normal setting is 8 minutes. Certain types of samples contain high boiling materials which can cause interference wtih the vinyl chloride peak on subsequent analyses. In these cases the analysis time must be adjusted to eliminate the interference. An automated backflush system can also be used to solve this problem.

c. B—Flushing—The normal setting is 0.2 minutes.

d. W—Stabilization time—The nomal setting is 0.2 minutes.

e. X—Number of analyses per sample—The normal setting is 1.

7.3.3 Preparation of sample turntable—Before placing any sample into turntable, be certain that the center section of the aluminum cap has been removed. The numbered sample bottles should be placed in the corresponding numbered positions in the turntable. Insert samples in the following order:

Positions 1 & 2—Old 2000 ppm standards for conditioning. These are necessary only after the analyzer has not been used for 24 hours or longer.

Position 3—50 ppm standard, freshly prepared.

Position 4—500 ppm standard, freshly prepared.

Position 5—2000 ppm standard, freshly prepared.

Position 6—4000 ppm standard, freshly prepared.

Position 7—Sample No. 7 (This is the first sample of the day, but is given as 7 to be consistent with the turntable and the integrator printout.)

After all samples have been positioned, insert the second set of 50, 500, 2000, and 4000 ppm standards. Samples, including standards must be conditioned in the bath of 90° C for 1 hour (not to exceed 5 hours).

7.3.4 Start chromatograph program—When all samples, including standards, have been conditioned at 90° C for 1 hour, start the analysis program according to the manufacturers' instructions. These instructions must be carefully followed when starting and stopping program to prevent damage to the dosing assembly.

7.3.5 Determination of total solids (TS). For wet cake, slurry, resin solution, and PVC latex samples, determine TS for each sample by accurately weighing approximately 3 to 4 grams of sample in an aluminum pan before and after placing in a draft oven (105 to 110° C). Samples must be dried to constant weight. After first weighing return the pan to the oven for a short period of time and then reweigh to verify complete dryness. TS is then calculated as the final sample weight divided by initial sample weight.

8. Calibration.

Calibration is to be performed each eight-hour period when the instrument is used. Each day, prior to running samples, the column should be conditioned by running two of the previous days 2000 ppm standards.

8.1 Preparation of Standards.

Calibration standards are prepared by filling the vials with the vinyl chloride/nitrogen standards, rapidly seating the septum and sealing with the aluminum cap. Use a stainless steel line from the cylinder to the vial. Do not use rubber or tygon tubing. The sample line from the cylinder must be purged (into hood) for several minutes prior to filling vials. After purging, reduce the flow rate to approximately 500–1000 cc/min. Place end of tubing into vial (near bottom) and after one minute slowly remove tubing. Place septum in vial as soon as possible to minimize mixing air with sample. After the standard vials are sealed, inject 100μl of distilled water.

8.2 Preparation of chromatograph calibration curve.

Prepare two 50 ppm, two 500 ppm, two 2000 ppm, and two 4000 ppm standard samples. Run the calibration samples in exactly the same manner as regular samples. Plot A_s, the integrator area counts for each standard sample vs C_s, the concentration of vinyl chloride in each standard sample. Draw a line of best fit through the points.

9. Calculations.

9.1 Response factor.

From the calibration curve described in Section 8.2, above, select the value of C_s that corresponds to A_s for each sample. Compute the response factor, R_f, for each sample, as follows:

$$R_f = \frac{A_s}{C_s} \qquad \text{Equation 107-1}$$

9.2 Residual vinyl chloride monomer concentration, or vinyl chloride monomer concentration.

Calculate C_{rvc} as follows:

$$C_{rvc} = \frac{A_s P_a}{R_f T_1}\left(\frac{M_v V_g}{m_s R} + K T_2\right)$$

Equation 107-2

where:

C_{rvc}=Concentration of vinyl chloride in the sample, in ppm.
P_a=Laboratory atmosphere pressure, mm Hg.
T_1=Room temperature, °K.
M_v=Molecular weight of VCM (62.5).
V_g=Volume of vapor phase (vial volume less sample volume).
m_s=Weight of sample, grams.
R=Gas constant (62,360).
K=Henry's Law constant for VCM in PVC at 90°C, $K=6.52\times10^{-6}=K_p$, for VCM in 1 cc (approximate) wastewater sample at 90°C, $K=5.0\times10^{-6}=K_w$.
T_2=Equilibration temperature, °K.

If the following conditions are met, Equation 107-2 can be simplified as follows:

1. T_1=22° C (295° K).
2. T_2=90° C (363° K).
3. P_a=750 mm. Hg.
4. $V_g = V_v - \frac{m_s}{1.4} = 23.5 - \frac{1m}{;t}$

where

V_v=Vial volume, cc (23.5).

5. Sample contains less than 0.5% water

$$C_{rvc} = \frac{A_s}{R_f}\left(4.197\times10^{-3} + \frac{5.988\times10^{-2}}{m_s}\right)$$

Equation 107-3

The following general equation can be used for any sample which contains VCM, PVC and/or water.

$$C_{rvc} = \frac{A_s P_a}{R_f T_1}$$
$$\times\left[\frac{M_v V_g}{R m_s} + K_p (TS)\, T_2 + K_w (1-TS)\, T_2\right]$$

Equation 107-4

where:

T_s=Total solids.
Note: K_w must be determined.

Results calculated using Equation 107-4 represent concentration based on the total sample. To obtain results based on dry PVC content, divide by TS.

For a 1 cc (approximate) wastewater sample, Equation 107-4 can be simplified to the following:

$$C_{rvc} = \frac{A_s}{R_f}\left[\frac{5.988\times10^{-2}}{m_s} + (2.066\times10^{-3})\right]$$

Equation 107-5

10. References.

1. Residual Vinyl Chloride Monomer Content of Polyvinyl Chloride Resins and Wet Cake Samples, B. F. Goodrich Chemical Co. Standard Test Procedure No. 1005–T. B. F. Goodrich Technical Center, Avon Lake, Ohio, January 30, 1975.

2. Berens, A. R., "The Solubility of Vinyl Chloride in Polyvinyl Chloride," ACS-Division of Polymer Chemistry, Polymer Preprints 15 (2): 197, 1974.

3. Berens, A. R., "The Diffusion of Vinyl Chloride in Polyvinyl Chloride," ACS-Division of Polymer Chemistry, Polymer Preprints 15 (2): 203, 1974.

4. Berens, A. R., L. B. Crider, C. J. Tomanek and J. M. Whitney, Analysis for Vinyl Chloride in PVC Powders by Head-Space Gas Chromatography," to be published.

[FR Doc.76-30849 Filed 10-20-76;8:45 am]

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of Santa Barbara County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the Santa Barbara County Air Pollution Control District, dated September 17, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published in the Notices section of this issue of the FEDERAL REGISTER. The amended § 61.04 is set forth below. It adds the address of the Santa Barbara County Air Pollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on September 17, 1976 and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District's address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c–7).

Dated: October 20, 1976.

PAUL DE FALCO, Jr.,
Regional Administrator,
EPA, Region IX.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b)(3) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *
(3) * * *
(A)–(E) * * *

F—CALIFORNIA

Bay Area Air Pollution Control District, 939 Ellis St., San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower St., (P.O. Box 997), Bakersfield, CA 93302.

Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482.

Monterey Bay Unified Air Pollution Control District, 420 Church St. (P.O. Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Rd., Santa Rosa, CA 95404.

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827.

San Joaquin County Air Pollution Control District, 1601 E. Hazelton St. (P.O. Box 2009), Stockton, CA 95201.

Santa Barbara Air Pollution Control District, 4440 Calle Real, Santa Barbara, CA 93110.

Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara St., Ventura, CA 93001.

[FR Doc.76-32105 Filed 11-2-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 213

WEDNESDAY, NOVEMBER 3, 1976

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Pima County Health Department on Behalf of Pima County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the Pima County Health Department on behalf of the Pima County Air Pollution Control District, dated October 7, 1976, EPA is today amending 40 CFR 61.04. Address, to reflect this delegation. A document announcing this delegation is published today at 41 FR in the Notices section of this issue. The amended § 61.04 is set forth below. It adds the address of the Pima County AirPollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within the Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on October 7, 1976 and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District's address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c–7).

Dated: November 19, 1976.

R. L. O'CONNELL,
Acting Regional Administrator Environmental Protection Agency, Region IX.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by adding subparagraph D to read as follows:

§ 61.04 Address.

* * * * *

(3) * * *
(A)–(C) * * *
D—Arizona

Pima County Air Pollution Control District, 151 West Congress Street, Tucson AZ 85701.

* * * * *

[FR Doc.76-35563 Filed 12-2-76;8:45 am]

[FRL 618-1]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Standard for Vinyl Chloride

Correction

In FR Doc. 76-30849 appearing at page 46560 in the FEDERAL REGISTER of Thursday, October 21, 1976 the following corrections should be made:

1. On page 46564, middle column, the amendatory language in the sixth paragraph, sixth and seventh line is corrected to read "amended by revising the authority and adding a new Subpart F reading as follows".

2. On page 46567, in the first column, in § 61.65(b)(9)(i), fifteenth line, the fourth word "The" should read "This".

3. On page 46567, middle column, second line from the top in § 61.65(c) should read "(1.250 gal) in volume for which an emis-".

4. (a) On page 46568, middle column, in § 61.68(a), eighth line, first word should read "emissions".

(b) On page 46568, middle column, in § 61.68(a) between the eighth and ninth lines insert the following "§61.64(a)(2) or to which fugitive emissions are required to be ducted in".

(c) On page 46568, third column, in § 61.68(c), the thirteenth to sixteenth lines should read: "chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by § 61.67. The".

5. On page 46568, third column, in § 61.70 the first line should read "(a) The owner or operator of any".

6. (a) On page 46570, first column, in Appendix B, Method 106, paragraph 4.3.2, second line should read "steel, 2.0 m X * * *"

(b) On page 46570, third column in Appendix B, Method 106, paragraph 6.4, sixth and seventh lines should read "of a disc integrator or a planimeter. Measure the peak height, H_m. Record A_m, H_m, and"

(c) On page 46570, third column, in Appendix B, Method 106, paragraph 6.5, the fifth line should read "determine and record the water vapor con-".

7. On page 46573, top of second column, in Appendix B, Method 107, paragraph 9.2, figure 4, the last figure in the equation should read

$$``\frac{m_i}{1.4}"$$

FEDERAL REGISTER, VOL. 41, NO. 234

FRIDAY, DECEMBER 3, 1976

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PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of California on Behalf of San Diego County Air Pollution Control District

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of California on behalf of the San Diego County Air Pollution Control District, dated November 8, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published in the Notices section of this issue, under EPA (FR Doc. 76-36929). The amended § 61.04 is set forth below. It adds the address of the San Diego County Air Pollution Control District to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within Air Pollution Control District.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 8, 1976 and it serves no purpose to delay the technical change of this addition of the Air Pollution Control District's address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended (42 U.S.C. 1857c-7).

Dated: November 26, 1976.

SHEILA M. PRINDIRVILLE,
Acting Regional Administrator, Environmental Protection Agency, Region IX.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph F to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(E) * * *

F-California:

Bay Area Air Pollution Control District, 939 Ellis Street, San Francisco, CA 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, CA 95531.

Fresno County Air Pollution Control District, 515 S. Cedar Avenue, Fresno, CA 93702.

Humboldt County Air Pollution Control District, 5600 S. Broadway, Eureka, CA 95501.

Kern County Air Pollution Control District, 1700 Flower Street (P.O. Box 997) Bakersfield, CA 93302.

Madera County Air Pollution Control District, 135 W. Yosemite Avenue, Madera, CA 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, CA 95482.

Monterey Bay Unified Air Pollution Control District, 420 Church Street (P.O: Box 487), Salinas, CA 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Road, Santa Rosa, CA 95404.

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, CA 95827.

San Diego County Air Pollution Control District, 9150 Chesapeake Drive, San Diego, CA 92123.

San Joaquin County Air Pollution Control District, 1601 E. Hazelton Street (P.O. Box 2009), Stockton, CA 95201.

Santa Barbara Air Pollution Control District, 4440 Calle Real, Santa Barbara, CA 93110.

Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, CA 95350.

Trinity County Air Pollution Control District, Box AJ, Weaverville, CA 96093.

Ventura County Air Pollution Control District, 625 E. Santa Clara Street, Ventura, CA 93001.

* * * * *

[FR Doc.76-36926 Filed 12-14-76;8:45 am]

FEDERAL REGISTER, VOL. 41, NO. 242

WEDNESDAY, DECEMBER 15, 1976

FEDERAL REGISTER, VOL. 41, NO. 252

THURSDAY, DECEMBER 30, 1976

32 SUBCHAPTER C—AIR PROGRAMS

DELEGATION OF AUTHORITY—NEW SOURCE REVIEW

Delegation of Authority to the State of North Carolina

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of North Carolina authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the reviews under 40 CFR Part 60 for the standards of performance for new stationary sources and reviews under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in this issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent instead to the North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, North Carolina 27611. Attention: Air Quality Section, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 24, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal regulations.

This rulemaking is effective immediately, and is issued under the authority of Sections 101, 110, 111, 112, and 301 of the Clean Air Act, as amended, 42 U.S.C. 1857, 1857c-5, 6, 7 and 1857g.

Dated: December 21, 1976.

JOHN A. LITTLE,
Deputy Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

3. Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows: In § 61.04, paragraph (b) is amended by revising subparagraph (II) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(HH) * * *

(II) North Carolina Environmental Management Commission, Department of Natural and Economic Resources, Division of Environmental Management, P.O. Box 27687, Raleigh, North Carolina 27611. Attention: Air Quality Section.

* * * * *

[FR Doc.76-38387 Filed 12-29-76;8:45 am]

33

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Vermont

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Vermont on September 3, 1976, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation is published today in the Federal Register (see FR Doc. 77-546 appearing in the notices section of this issue). The amended § 61.04, which adds the address of the Vermont Agency of Environmental Protection to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on September 3, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. 42 U.S.C. 1847c-7.

Dated: December 17, 1976.

John A. S. McGlennon,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by revising subparagraph (UU) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(UU)—State of Vermont, Agency of Environmental Protection, Box 489, Montpelier, Vermont 05602.

* * * * *

[FR Doc.77-548 Filed 1-5-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 4
THURSDAY, JANUARY 6, 1977

34

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 673-6]

NEW SOURCE REVIEW

Delegation of Authority to the State of South Carolina

The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of South Carolina authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A notice announcing the delegation of authority is published elsewhere in the notices section of this issue of the Federal Register. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent to the Office of Environmental Quality Control, Depart-partment of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201, instead of EPA's Region IV.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on October 19, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 101, 110, 111, 112, and 301 of the Clean Air Act, as amended, 42 U.S.C. 1857c-5, 6, 7 and 1857g.

Dated: January 11, 1977.

John A. Little,
Acting Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of South Carolina

3. Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended by revising subparagraph (PP) of § 61 04(b) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(OO) * * *

(PP) State of South Carolina, Office of Environmental Quality Control, Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201.

* * * * *

[FR Doc.77-1969 Filed 1-21-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 15
MONDAY, JANUARY 24, 1977

35

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to City of Philadelphia

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the City of Philadelphia on September 30, 1976, EPA is today amending 40 CFR 61.04. Address, to reflect this delegation. For a Notice announcing this delegation, see FR Doc. 77-3712 published in the Notices section of today's Federal Register. The amended § 61.04, which adds the address of the Philadelphia Department of Public Health, Air Management Services, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this Administrative amendment was effective on September 30, 1976, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended. 42 U.S.C. 1857c-7.

Dated: January 25, 1977.

A. R. Morris,
Acting Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising Subparagraph (NN) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(MM) * * *

(NN)(b) City of Philadelphia.
Philadelphia Department of Public Health.
Air Management Services,
801 Arch Street,
Philadelphia, Pennsylvania 19107.

[FR Doc.77-3711 Filed 2-3-77;8:45 am]

[FRL 662-5]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to Commonwealth of Pennsylvania

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the Commonwealth of Pennsylvania on September 30, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. For a Notice announcing this delegation, see FR Doc 77-3713 published in the Notices section of today's Federal Register. The amended § 61.04, which adds the address of the Pennsylvania Department of Environmental Resources, Bureau of Air Quality and Noise Control, to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this Administrative amendment was effective on September 30, 1976, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: January 25, 1977.

A. R. MORRIS,
Acting Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising Subparagraph (NN) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)–(MM) * * *

(NN) (a) Commonwealth of Pennsylvania (except for City of Philadelphia and Allegheny County)

Pennsylvania Department of Environmental Resources,
Bureau of Air Quality and Noise Control,
Post Office Box 2063,
Harrisburg, Pennsylvania 17120.

[FR Doc.77-3710 Filed 2-3-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 24
FRIDAY, FEBRUARY 4, 1977

36

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 684-4]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Amendment to Asbestos Standard

• *Purpose.* The purpose of this amendment is to clarify that the demolition and renovation provisions of the asbestos standard apply when friable asbestos materials used for insulation and fireproofing are removed from non-load-supporting structural members, such as non-supporting walls and ceilings, as well as from load-supporting structural members. •

Under section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c–7, (the "Act"), the Administrator of the Environmental Protection Agency promulgated the national emission standard for the hazardous air pollutant asbestos on April 6, 1973 (38 FR 8820). Amendments to this standard were promulgated on May 3, 1974 (39 FR 15396) and on October 14, 1975 (40 FR 48292). The standard does not include a definition for the term "structural member", and questions have arisen concerning what constitutes a structural member. The definition of "structural member" is therefore being added to 40 CFR 61.21 to clarify that the standard applies to both load-supporting and non-load-supporting structural members. The latter category includes such items as ceilings and non-load-supporting walls.

The preamble to the proposed amendments (39 FR 38064, October 25, 1974) that were promulgated on October 14, 1975, clearly stated that EPA intended to cover non-load-supporting structural members. No contrary intent was expressed at the time of final promulgation. The amendment promulgated below clarifies EPA's intent and should answer future questions on the applicability of the standard.

The Administrator finds that a prepromulgation public comment period on this amendment would be "impracticable, unnecessary, or contrary to the public interest" within the meaning of 5 U.S.C. 553(b)(B) because the rulemaking clarifies and interprets an existing regulation, does not alter the intended content of that regulation, and enables EPA to enforce the existing standard in a consistent and proper manner. Also, the Administrator finds that this rulemaking should be effective upon promulgation without a 30-day deferral within the meaning of 5 U.S.C. 553(d), because of the immediate effectiveness required by section 112(b)(1)(C) of the Act and the interpretive nature of this rulemaking.

Other questions have been raised recently about the applicability of the asbestos standard to decorative coatings. The words of the current standard do not apply to such coatings. EPA is proposing amendments to the asbestos standard elsewhere in this issue of the FEDERAL REGISTER to regulate such coatings.

(Sec. 112, Clean Air Act as aded by sec. 4(a) of Pub. L. 91–604, 84 Stat. 1685 (42 U.S.C. 1857c–7); sec. 114, Clean Air Act, as added by sec. 4(a) of Pub. L. 91–604, 84 Stat. 1687, and amended by Pub. L. 93–319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c–9); sec. 301(a), Clean Air Act, as amended by sec. 15(c)(2) of Pub. L. 91–604, 84 Stat. 1713 (42 U.S.C. 1857g(a)).)

Dated: February 23, 1977.

JOHN QUARLES,
Acting Administrator.

In Part 61 of Chapter I, Title 40 of the Code of Federal Regulations, § 61.21 is amended by adding paragraph (x) as follows:

Subpart B—National Emission Standard for Asbestos

§ 61.21 Definitions.

* * * * *

(x) "Structural member" means any load-supporting member, such as beams and load-supporting walls; or any non-load-supporting member, such as ceilings and non-load-supporting walls.

[FR Doc.77-5981 Filed 3-1-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 41
WEDNESDAY, MARCH 2, 1977

37

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Region V Address; Correction

Section 61.04 paragraph (a) is corrected by changing Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 1 North Wacker Drive, Chicago, Illinois 60606 to Region V (Illinois, Indiana, Minnesota, Michigan, Ohio, Wisconsin), 230 South Dearborn Street, Chicago, Illinois 60604.

Dated: March 21, 1977.

GEORGE R. ALEXANDER,
Regional Administrator.

[FR Doc.77-9407 Filed 3-29-77;8:45 am]

[FRL [illegible]]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of Wisconsin

Pursuant to the delegation of authority for national emission standards for hazardous air pollutants (NESHAPS) to the State of Wisconsin on September 28, 1976, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A Notice announcing this delegation is published today March 30, 1977, at 42 FR 16845 in this FEDERAL REGISTER. The amended Section 61.04, which adds the address of the Wisconsin Department of Natural Resources to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on September 28, 1976, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 1857c-7.

Dated: March 21, 1977.

GEORGE R. ALEXANDER, Jr.,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraph (YY) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(XX) * * *
(YY) Wisconsin—
Wisconsin Department of Natural Resources,
P.O. Box 7921, Madison, Wisconsin 53707.

[FR Doc.77-9406 Filed 3-29-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 61—WEDNESDAY, MARCH 30, 1977

38

FEDERAL REGISTER, VOL. 42, NO. 109—
—TUESDAY, JUNE 7, 1977

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Standard for Vinyl Chloride; Corrections and Amendments

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: These amendments are being made to the vinyl chloride standard which was promulgated under the authority of the Clean Air Act on October 21, 1976. The standard contains some typographical errors and needs clarification in some parts. These amendments are intended to correct the typographical errors and clarify the standard.

EFFECTIVE DATE: June 7, 1977.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone 919-688-8146, ext. 271.

SUPPLEMENTARY INFORMATION: On October 21, 1976, under section 112 of the Clean Air Act, as amended (42 U.S.C. 1857), the Environmental Protection Agency (EPA) promulgated a national emission standard for vinyl chloride (41 FR 46560). The standard covers plants which manufacture ethylene dichloride, vinyl chloride, and/or polyvinyl chloride. Since that time, it has become apparent that a few sections of the standard and Test Methods 106 and 107 are unclear. The purpose of the amendments being made at this time is to clarify these sections and to correct typographical errors. These corrections are in addition to those published on December 3, 1976 (41 FR 53017). The Administrator finds that good cause exists for omitting prior notice and public comment on these amendments as unnecessary and for making them immediately effective because they simply clarify and correct the existing regulations and impose no additional substantive requirements.

The most significant amendment involves clarification of the requirements for certification of the analysis of gas cylinders which may be used to calibrate testing and monitoring equipment. The standard, as promulgated on October 21, 1976, requires that an analysis of the gas used for calibration purposes, "* * * be traceable to the National Bureau of Standards or to a gravimetrically calibrated permeation tube." Comments were received indicating that the term "traceable" was unclear.

These amendments require that the composition of gas cylinders which may be used for calibration of testing and monitoring equipment be certified by the gas manufacturer. The certified composition must have been determined by direct analysis of the gas contained in each calibration cylinder using an analytical procedure the manufacturer had calibrated on the day the analysis was performed. Calibration of the analytical procedure was to have been done using gases for which the concentrations have been verified: (1) By comparison with a calibrated vinyl chloride permeation tube, (2) by comparison with a gas mixture prepared in acordance with the procedure described in § 7.1 of Test Method 106 and using 99.9 percent vinyl chloride, or (3) by direct analysis by the National Bureau of Standards. These amendments are being made to §§ 61.65(b)(8)(iii) and 61.68(c), which contain the monitoring requirements, and to §§ 5.2 and 6.2 of Test Methods 106 and 107, respectively.

There are several other changes in wording for clarification purposes. For example, § 61.60 is being amended to clarify that the testing, reporting, and recordkeeping requirements apply to research and development equipment subject to §§ 61.64 (a)(1), (b), (c), and (d), and definitions for standard temperature and pressure are being added to § 61.61. The phrase "in vinyl chloride service" is being added to § 61.65(b)(1) to clarify that loading and unloading lines which clearly do not contain vinyl chloride do not have to be continuously tested to demonstrate that fact. Section 61.67(d) is being redesignated as § 61.67(g)(1)(ii) to clarify that conducting a series of three runs is not necessary when Test Method 107 is being used to determine emissions. A change is being made in § 61.67(g)(1)(iii) [which was originally promulgated as § 61.67(g)(1)(ii)] to establish that the concentration emission limits for gas streams are to be determined on a dry basis. Similarly, wording is being added to § 61.70(c)(2)(v) to establish that vinyl chloride concentrations in polyvinyl chloride resin are to be determined on a dry weight basis. An additional change to this same section is being made to clarify that a sample from each batch of resin is to be measured for its vinyl chloride content. Section 61.71(a) is being changed to correct typographical errors and to clarify that daily operating records for polyvinyl chloride reactors are required to be kept whether a relief valve discharges or not.

Section 4.3.2 of Test Method 106 is being revised to allow the option of using Poropak T as the column packing instead of GE SF-96 in a secondary gas chromatographic column if acetaldehyde is present. This packing has also been shown to produce adequate separation of vinyl chloride and acetaldehyde. Section 61.67(e) of the regulation and § 6.2 of Test Method 106 are being amended to include a limit on the amount of time a test sample can be kept before it is analysed for vinyl chloride. Section 1.2 of Test Method 107 is being amended to clarify that chromatograph parameters can be altered if the precision and reproducibility of analysis of vinyl chloride cylinder standards is not impaired. Section 5.3.2 of Test Method 107 is being amended to allow the use of a pair of Poropak Q columns if methanol or acetaldehyde is present in the sample. Also in Test Method 107 a clarification for the term K_v has been added to § 9.2.

The remaining changes are corrections of typographical errors or are self-explanatory.

These amendments are issued under the authority of section 112 of the Clean Air Act, sec. 4(a) of Pub. L. 91-604, 84 Stat. 1685 (42 U.S.C. 1857c-7) and section 301(a) of the Clean Air Act, sec. 2 of Pub. L. No. 90-148, 81 Stat. 504, as amended by sec. (15)(c)(2) of Pub. L. 91-604, 84 Stat. 1713 (42 U.S.C. 1857g (a)). The amendments to §§ 61.67 and 61.68 are also issued under the authority of section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91-604, 84 Stat. 1687 and amended by Pub. L. 93-319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c-9).

NOTE: The Environmental Protection Agency has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Analysis under Executive Orders 11821 and 11949 and OMB Circular A-107.

Dated: May 26, 1977.

EDWARD F. TUERK,
Acting Assistant Administrator for Air and Waste Management.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.60, paragraph (c) is amended as follows:

§ 61.60 Applicability.

* * * * *

(c) Sections of this subpart other than §§ 61.61; 61.64 (a)(1), (b), (c), and (d); 61.67; 61.68; 61.69; 61.70; and 61.71 * * *.

2. In § 61.61 paragraphs (t) and (u) are added as follows:

§ 61.61 Definitions.

* * * * *

(t) "Standard temperature" means a temperature of 20° C (68° F).

(u) "Standard pressure" means a pressure of 760 mm of Hg (29.92 in. of Hg).

3. Section 61.62 is corrected as follows:

§ 61.62 Emission standard for ethylene dichloride plants.

(a) Ethylene dichloride purification: The concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed 10 ppm, except as provided in § 61.65(a). This requirement does not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere from each oxychlorination reactor are not to exceed 0.2 g/kg (0.0002 lb/lb) of the 100 percent ethylene dichloride product from the oxychlorination process.

4. In § 61.65, paragraphs (b)(1), (b)(8)(iii)(A), and (b)(8)(iii)(B) are amended as follows:

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride and polyvinyl chloride plants.

* * * * *

(b) * * *

(1) Loading and unloading lines: Vinyl chloride emissions from loading and unloading lines in vinyl chloride service which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:

* * * * *

(8) * * *

(iii) * * *

(A) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.2 of Test Method 106 and in accordance with section 7.1 of Test Method 106, or

(B) A calibration gas cylinder standard containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard is to have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in section 7.3 of Test Method 106. The requirements in section 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards are to be followed.

(Secs. 112 and 301(a), Clean Air Act (42 U.S.C. 1857c-7 and 1857g(a)).)

5. Section 61.67 is amended by deleting and reserving paragraph (d), revising paragraphs (e), (g)(1)(ii) and (g)(1)(iii), and by adding paragraph (g)(1)(iv) as follows:

§ 61.67 Emission tests.

* * * * *

(d) [Reserved]

(e) When at all possible, each sample is to be analyzed within 24 hours, but in no case in excess of 72 hours of sample collection. Vinyl chloride emissions are to be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.

* * * * *

(g) * * *

(1) * * *

(ii) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The average is to be computed on a time weighted basis.

(iii) For gas streams containing more than 10 percent oxygen the concentration of vinyl chloride as determined by Test Method 106 is to be corrected to 10 percent oxygen (dry basis) for determination of emissions by using the following equation:

$$C_{b\,(corrected)}=C_b\frac{10.9}{20.9-\text{percent } O_2}$$

where:

$C_{b\,(corrected)}$ = The concentration of vinyl chloride in the exhaust gases, corrected to 10-percent oxygen.

C_b = The concentration of vinyl chloride as measured by Test Method 106.

20.9 = Percent oxygen in the ambient air at standard conditions.

10.9 = Percent oxygen in the ambient air at standard conditions, minus the 10.0-percent oxygen to which the correction is being made.

Percent O_2 = Percent oxygen in the exhaust gas as measured by Reference Method 3 in Appendix A of Part 60 of this chapter.

(iv) For those emission sources where the emission limit is prescribed in terms of mass rather than concentration, mass emissions in kg/100 kg product are to be determined by using the following equation:

$$C_{BX}=\frac{[C_b\,(2.60)\,Q\,10^{-6}]\,[100]}{Z}$$

where:

C_{BX} = kg vinyl chloride/100 kg product.

C_b = The concentration of vinyl chloride as measured by Test Method 106.

2.60 = Density of vinyl chloride at one atmosphere and 20° C in kg/m^3.

Q = Volumetric flow rate in m^3/hr as determined by Reference Method 2 of Appendix A to Part 60 of this chapter.

10^{-6} = Conversion factor for ppm.

Z = Production rate (kg/hr).

* * * * *

6. Section 61.68 is amended by revising paragraphs (c)(1) and (c)(2) as follows:

§ 61.68 Emission monitoring.

* * * * *

(c) * * *

(1) A calibration gas mixture prepared from the gases specified in sections 5.2.1 and 5.2.2 of Test Method 106 and in accordance with section 7.1 of Test Method 106, or

(2) A calibration gas cylinder standard containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard is to have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in section 7.3 of Test Method 106. The requirements in sections 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards are to be followed.

(Secs. 112, 114, and 301(a), Clean Air Act (42 U.S.C. 1857c-7, 1857c-9, and 1854g(a)))

7. In § 61.70 paragraphs (c)(2)(i) and (c)(2)(v) are amended as follows.

§ 61.70 Semiannual report.

* * * * *

(c) * * *

(2) * * *

(i) If batch stripping is used, one representative sample of polyvinyl chloride resin is to be taken from each batch of each grade of resin immediately following the completion of the stripping operation, and identified by resin type and grade and the date and time the batch is completed. The corresponding quantity of material processed in each stripper batch is to be recorded and identified by resin type and grade and the date and time the batch is completed.

* * * * *

(v) The report to the Administrator by the owner or operator is to include the vinyl chloride content found in each sample required by paragraphs (c)(2)(i) and (c)(2)(ii) of this section, averaged separately for each type of resin, over each calendar day and weighted according to the quantity of each grade of resin processed by the stripper(s) that calendar day, according to the following equation:

$$A_{T_i}=\frac{\sum_{i}^{n}=1\,P_{G_i}M_{G_i}}{Q_{T_i}}=\frac{P_{G_1}M_{G_1}+P_{G_2}M_{G_2}+\cdots+P_{G_n}M_{G_n}}{Q_{T_i}}$$

where:

A = 24-hour average concentration of type T_i resin in ppm (dry weight basis).

Q = Total production of type T_i resin over the 24-hour period, in kg.

T_i = Type of resin; $i=1,2\ldots m$ where m is total number of resin types produced during the 24-hour period.

M = Concentration of vinyl chloride in one sample of grade G_i resin, in ppm.

P = Production of grade G_i resin represented by the sample, in kg.

G_i = Grade of resin; e.g., G_1, G_2, and G_3.

n = Total number of grades of resin produced during the 24-hour period.

* * * * *

8. Section 61.71 is amended by correcting paragraphs (a)(2) and (a)(3), and by adding paragraph (a)(4) as follows:

§ 61.71 Recordkeeping.

(a) * * *

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by § 61.65(b)(8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak, and any action taken to eliminate that leak.

(3) A record of emissions measured in accordance with § 61.68.

(4) A daily operating record for each polyvinyl chloride reactor, including pressures and temperatures.

9. Section 1.1 of Test Method 106 is corrected as follows:

1.1 An integrated bag sample of stack gas containing vinyl chloride (chloroethene) is subjected to chromatographic analysis, using a flame ionization detector.

10. Section 3 of Test Method 106 is corrected as follows:

3. *Interferences.* Acetaldehyde, which can occur in some vinyl chloride sources, will interfere with the vinyl chloride peak from the Chromosorb 102[1] column. See sections 4.3.2 and 6.4. If resolution of the vinyl chloride peak is still not satisfactory for a particular sample, then chromatograph parameters can be further altered with prior approval of the Administrator. If alteration of the chromatograph parameters fails to resolve the vinyl chloride peak, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, must be performed.

11. Section 4.1 of Test Method 106 is corrected as follows:

4.1 *Sampling* (Figure 106-1).

12. Section 4.1.3 of Test Method 106 is corrected as follows:

4.1.3 Male (2) and female (2) stainless steel quick-connects, with ball checks (one pair without) located as shown in Figure 106-1.

13. Section 4.1.10 of Test Method 106 is corrected as follows:

4.1.10 *Connecting tubing.* Teflon, 6.4 mm outside diameter, to assemble sample train (Figure 106–1).

14. Section 4.3.2 of Test Method 106 is amended as follows:

4.3.2 *Chromatographic column.* Stainless steel, 2 m×3.2 mm, containing 80/100 mesh Chromasorb 102. A secondary column of GE SF-96, 20 percent on 60/80 mesh AW Chromasorb P, stainless steel, 2 m×3.2 mm or Porapak T, 80/100 mesh, stainless steel, 1 m×3.2 mm is required if acetaldehyde is present. If used, a secondary column is placed after the Chromasorb 102 column. The combined columns should then be operated at 120° C.

15. Section 5.2 of Test Method 106 is revised as follows:

5.2 *Calibration.* Use one of the following options: either 5.2.1 and 5.2.2, or 5.2.3.

5.2.1 *Vinyl chloride, 99.9+ percent.* Pure vinyl chloride gas certified by the manufacturer to contain a minimum of 99.9 percent vinyl chloride for use in the preparation of standard gas mixtures in Section 7.1. If the gas manufacturer maintains a bulk cylinder supply of 99.9+ percent vinyl chloride, the certification analysis may have been performed on this supply rather than on each gas cylinder prepared from this bulk supply. The date of gas cylinder preparation and the certified analysis must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer.

5.2.2 *Nitrogen gas.* Zero grade, for preparation of standard gas mixtures.

5.2.3 *Cylinder standards* (3). Gas mixture standards (50, 10, and 5 ppm vinyl chloride in nitrogen cylinders) for which the gas composition has been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer. These gas mixture standards may be directly used to prepare a chromatograph calibration curve as described in section 7.3.

5.2.3.1 *Cylinder standards certification.* The concentration of vinyl chloride in nitrogen in each cylinder must have been certified by the manufacturer by a direct analysis of each cylinder using an analytical procedure that the manufacturer had calibrated on the day of cylinder analysis. The calibration of the analytical procedure shall, as a minimum, have utilized a three-point calibration curve. It is recommended that the manufacturer maintain two calibration standards and use these standards in the following way: (1) a high concentration standard (between 50 and 100 ppm) for preparation of a calibration curve by an appropriate dilution technique; (2) a low concentration standard (between 5 and 10 ppm) for verification of the dilution technique used.

5.2.3.2 *Establishment and verification of calibration standards.* The concentration of each calibration standard must have been established by the manufacturer using reliable procedures. Additionally, each calibration standard must have been verified by the manufacturer by one of the following procedures, and the agreement between the initially determined concentration value and the verification concentration value must be within ± 5 percent: (1) vertification value determined by comparison with a calibrated vinyl chloride permeation tube, (2) verification value determined by comparison with a gas mixture prepared in accordance with the procedure described in section 7.1 and using 99.9+ percent vinyle chloride, or (3) verification value obtained by having the calibration standard analyzed by the National Bureau of Standards. All calibration standards must be renewed on a time interval consistent with the shelf life of the cylinder standards sold.

16. Section 6.2 of Test Method 106 is amended as follows:

6.2 *Sample storage.* Sample bags must be kept out of direct sunlight. When at all possible analysis is to be performed within 24 hours, but in no case in excess of 72 hours of sample collection.

17. Section 7.1 of Test Method 106 is amended as follows:

7.1 *Preparation of vinyl chloride standard gas mixtures.* Evacuate a sixteen-inch square Tedlar bag that has passed a leak check (described in Section 7.4) and meter in 5 liters of nitrogen. While the bag is filling, use the 0.5 ml syringe to inject $250\mu l$ of 99.9+ percent vinyl chloride through the wall of the bag. Upon withdrawing the syringe needle, immediately cover the resulting hole with a piece of adhesive tape. The bag now contains a vinyl chloride concentration of 50 ppm. In a like manner use the other syringe to prepare gas mixtures having 10 and 5 ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases. These gas mixture standards may be used for 10 days from the date of preparation, after which time preparation of new gas mixtures is required. (CAUTION.—Contamination may be a problem when a bag is reused if the new gas mixture standard contains a lower concentration than the previous gas mixture standard did.)

18. Section 7.3 of Test Method 106 is amended as follows:

7.3 *Preparation of chromatograph calibration curve.* Make a gas chromatographic measurement of each gas mixture standard (described in section 5.2.2 or 7.1) using conditions identical with those listed in sections 6.3 and 6.4. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with each standard gas mixture and activate the sample valve. Record C_c, the concentration of vinyl chloride injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multiplied by the attenuator setting. Repeat until two injection areas are within 5 percent, then plot these points v. C_c. When the other concentrations have been plotted, draw a smooth curve through the points. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

19. Section 1.2 of Test Method 107 is amended as follows:

1.2 This procedure is suitable for determining the vinyl choride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused forms, such as sheet or cubes. If a resolution of the vinyl chloride peak is not satisfactory for a particular sample, then chromatograph parameters may be altered provided that the precision and reproducibility of the analysis of vinyl chloride cylinder standards are not impaired. If there is reason to believe that some other hydrocarbon with an identical retention time is present in the sample, then supplemental confirmation of the vinyl chloride peak through an absolute analytical technique, such as mass spectroscopy, should be performed.

20. Section 5.3.2 is amended as follows:

5.3.2 *Chromatographic column.* Stainless steel, 2 m × 3.2 mm, containing 0.4 percent Carbowax 1500 on Carbopak A, Perkin-Elmer Corporation No. 105–0133, or equivalent. Carbopak C can be used in place of Carbopak A. If methanol and/or acetaldehyde is present in the sample, a pair of Poropak Q columns in series (1 m × 3.2 mm followed by 2 m × 3.2 mm) with provision for backflush of the first column has been shown to provide adequate separation of vinyl chloride.

21. Section 6.2 of Test Method 107 is revised as follows:

6.2 *Calibration.*

6.2.1 *Cylinder standards* (4). Gas mixture standards (50, 500, 2,000, and 4,000 ppm vinyl chloride in nitrogen cylinders) for which the gas composition has been certified by the manufacturer. Lower concentration standards should be obtained if lower concentrations of vinyl chloride samples are expected, as the intent is to bracket the sample concentrations with standards. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value. The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer.

6.2.1.1 *Cylinder standards certification.* The concentration of vinyl chloride in nitrogen in each cylinder must have been certified by the manufacturer by a direct analysis of each cylinder using an analytical procedure that the manufacturer had calibrated on the day of cylinder analysis. The calibration of the analytical procedure shall, as a minimum, have utilised a three-point calibration curve. It is recommended that the manufacturer maintain two calibration standards and use these standards in the following way: (1) a high concentration standard (between 4,000 and 8,000 ppm) for preparation of a calibration curve by an appropriate dilution technique; (2) a low concentration standard (between 50 and 500 ppm) for verification of the dilution technique used.

6.2.1.2 *Establishment and verification of calibration standards.* The concentration of each calibration standard must have been established by the manufacturer using reliable procedures. Additionally, each calibration standard must have been verified by the manufacturer by one of the following procedures, and the agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent: (1) verification value determined by comparison with a gas mixture standard generated in a similar manner to the procedure described in section 7.1 of Method 106 for preparing gas mixture standards using 99.9+ percent vinyl chloride, or (2) verification value obtained by having the calibration standard analyzed by the National Bureau of Standards. All calibration standards must be renewed on a time interval consistent with the shelf life of the cylinder standards sold.

22. Section 7.3.2.d. of Test Method 107 is corrected as follows:

d. *W—Stabilization time.* The normal setting is 0.2 minutes.

23. Section 9.2 of Test Method 107 is corrected as follows:

9.2 Residual vinyl chloride monomer concentration, or vinyl chloride monomer concentration.

Calculate C_{rvc} as follows:

$$C_{rvc}=\frac{A_s P_a}{R_f T_1}\left(\frac{M_v V_g}{m_s R}+K T_2\right)$$

Equation 107-2

where:

C_{rvc} = Concentration of vinyl chloride in the sample, in ppm.
P_a = Laboratory atmosphere pressure, mm Hg.
T_1 = Room temperature, °K.
M_v = Molecular weight of VCM (62.5).
V_g = Volume of vapor phase (vial volume less sample volume).
m_s = Weight of sample, grams.
R = Gas constant [62,360 (cc-mm-mole-degrees Kelvin)]
K = Henry's Law constant. For VCM in PVC at 90° C, $K=6.52\times10^{-6}=K_p$. For VCM in 1 cc (approximate) wastewater sample at 90° C, $K=5.0\times10^{-6}=K_w$.
T_2 = Equilibration temperature, °K.

If the following conditions are met, Equation 107-2 can be simplified as follows:

1. $T_1=22°$ C (295° K)
2. $T_2=90°$ C (363° K)
3. $P_a=750$ mm Hg.
4. $V_g=V_v-\frac{m_s}{1.4}=23.5-\frac{m_s}{1.4}$

where

V_v = Vial volume, cc (23.5).

5. Sample contains less than 0.5 percent water.

$$C_{rvc}=\frac{A_s}{R_f}\left(4.197\times10^{-3}+\frac{5.988\times10^{-2}}{m_s}\right)$$

Equation 107-3

The following general equation can be used for any sample which contains VCM, PVC and water.

$$C_{rvc}=\frac{A_s P_a}{R_f T_1}\times\left[\frac{M_v V_g}{R m_s}+K_p(TS)T_2+K_w(1-TS)T_2\right]$$

Equation 107-4

where:

TS = Total solids.

NOTE: K_w must be determined for samples with a vapor volume to liquid volume ratio other than 22.5 to 1. This ratio can be obtained by adjusting the sample weight through giving consideration to the total solids and density of the PVC.

Results calculated using Equation 107-4 represent concentration based on the total sample. To obtain results based on dry PVC content, divide by TS.

For a 1-cc wastewater sample (that is, 22.5 to 1 vapor volume to liquid volume ratio), K_w is 5.0×10^{-6}. Thus, Equation 107-4 can be simplified to the following:

$$C_{rvc}=\frac{A_s}{R_f}\left[\frac{5.988\times10^{-2}}{m_s}+(2.066\times10^{-2})\right]$$

,Equation 107-5

(Secs. 112 and 301(a) of the Clean Air Act, 42 U.S.C. 1857c-7 and 1857g(a).)

[FR Doc.77-15828 Filed 6-6-77;8:45 am]

39

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the State of New Jersey

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: A notice announcing EPA's delegation of authority for certain categories of the National Emission Standards for Hazardous Air Pollutants regulations to the State of New Jersey is published at page 37386 of today's FEDERAL REGISTER. In order to reflect this delegation, this document amends EPA regulations to require the submission of all notices, reports, and other communications called for by the delegated regulations to the State of New Jersey rather than to EPA.

EFFECTIVE DATE: July 21, 1977.

FOR FURTHER INFORMATION CONTACT:

J. Kevin Healy, Attorney, U.S. Environmental Protection Agency, Region II, General Enforcement Branch, Enforcement Division, 26 Federal Plaza, New York, New York 10007 (212-264-1196).

SUPPLEMENTARY INFORMATION: On May 9, 1977 EPA delegated authority to the State of New Jersey to implement and enforce many categories of the National Emission Standards for Hazardous Air Pollutants regulations. A full account of the background to this action and of the exact terms of the delegation appear in the Notice of Delegation which is also being published in today's FEDERAL REGISTER.

This rulemaking is effective immediately, since the Administrator has found good cause to forego prior public notice. This addition of the State of New Jersey address to the Code of Federal Regulations is a technical change and imposes no additional substantive burden on the parties affected.

Dated: July 18, 1977.

BARBARA BLUM,
Acting Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended, under authority of section 112 of the Clean Air Act (42 U.S.C. 1857c-7), as follows:

(1) In § 61.04 paragraph (b) is amended by revising subparagraph (FF) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(FF)—State of New Jersey: New Jersey Department of Environmental Protection, John Fitch Plaza, P.O. Box 2807, Trenton, New Jersey 08625.

* * * * *

[FR Doc.77-21021 Filed 7-20-77;8:45 am]

40

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 775-4]

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Authority Citations; Revision

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This action revises the authority citations for Standards of Performance for New Stationary Sources and National Emission Standards for Hazardous Air Pollutants. The revision adopts a method recommended by the FEDERAL REGISTER for identifying which sections are enacted under which statutory authority, making the citations more useful to the reader.

EFFECTIVE DATE: August 17, 1977.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone 919-541-5271.

SUPPLEMENTARY INFORMATION: This action is being taken in accordance with the requirements of 1 CFR 21.43 and is authorized under section 301(a) of the Clean Air Act, as amended, 42 U.S.C. 1857g(a). Because the amendments are clerical in nature and affect no substantive rights or requirements, the Administrator finds it unnecessary to propose and invite public comment.

Dated: August 12, 1977.

DOUGLAS M. COSTLE,
Administrator.

Parts 60 and 61 of Chapter I, Title 40 of the Code of Federal Regulations are revised as follows:

* * * * * * * *

4. The authority citation following the table of sections in Part 61 is revised to read as follows:

AUTHORITY: Sec. 112, 301(a) of the Clean Air Act as amended (42 U.S.C. 1857c-7, 1857g (a)), unless otherwise noted.

5. Following § 61.16, the following authority citation is added:

(Sec. 116 of the Clean Air Act as amended (42 U.S.C. 1857d-1).)

6. Following §§ 61.09, 61.10, 61.12, 61.13, 61.14, 61.15, 61.24, 61.33, 61.34, 61.43, 61.44, 61.53, 61.54, 61.55, 61.67, 61.68, 61.69, 61.70, 61.71, and Appendices A and B, the following authority citation is added:

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 1857c-9).)

[FR Doc.77-23827 Filed 8-16-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 159—
—WEDNESDAY, AUGUST 17, 1977

41

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 784-7]

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority; New Source Review; State of Montana

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This rule will change the address to which reports and applications must be sent by operators of new sources in the State of Montana. The address change is the result of delegation of authority to the State of Montana for New Source Performance Standards (40 CFR Part 60) and National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61).

ADDRESS: Any questions or comments should be sent to Director, Enforcement Division, Environmental Protection Agency, 1860 Lincoln Street, Denver, Colo. 80295.

FOR FURTHER INFORMATION CONTACT:

Mr. Irwin L. Dickstein, 303-837-3868.

SUPPLEMENTARY INFORMATION: The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the State of Montana authority to review new and modified sources. The delegated authority includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants.

A Notice announcing the delegation of authority is published today in the FEDERAL REGISTER (42 FR 44573). The amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent to the Montana Department of Health and Environmental Sciences instead of EPA's Region VIII.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on May 18, 1977, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of sections 111 and 112 of the Clean Air Act, as amended, 42 U.S.C. 1857, 1857c-5, 6, 7 and 1857g.

Dated: August 17, 1977.

JOHN A. GREEN,
Regional Administrator.

Part 60 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 60.4 paragraph (b) is amended by revising subparagraph (BB) to read as follows:

§ 60.4 Address.

* * * * *

(b) * * *

(BB) State of Montana, Department of Health and Environmental Services, Cogswell Building, Helena, Mont. 59601.

* * * * *

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

2. In § 61.04 paragraph (b) is amended by revising subparagraph (BB) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(BB) State of Montana, Department of Health and Environmental Sciences, Cogswell Building, Helena, Mont. 59601.

[FR Doc.77-25827 Filed 9-2-77;8:45 am]

FEDERAL REGISTER, VOL. 42, NO. 172—
—TUESDAY, SEPTEMBER 6, 1977

42

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 784-3]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Units and Abbreviations

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This action revises the General Provisions by reorganizing the units and abbreviations, and adding the International System of Units (SI). Until recently, EPA did not have a preferred system of measurement to be used in its regulations issued under this part. Now the Agency is using SI units in all regulations issued under this part. This necessitates that SI units be added to the General Provisions to provide a complete listing of abbreviations used.

EFFECTIVE DATE: October 31, 1977.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone (919-541-5271).

SUPPLEMENTARY INFORMATION: Section 3 of Pub. L. 94-168, the Metric Conversion Act of 1975, declares that the policy of the United States shall be to coordinate and plan the increasing use of the metric system in the United States. On December 10, 1976, a notice was published in the FEDERAL REGISTER (41 FR 54018) that set forth the interpretation and modification of the International System of Units (SI) for the United States. EPA incorporates SI units in all regulations issued under 40 CFR Part 61 and provides common equivalents in parentheses where desirable. Use of SI units requires this revision of the abbreviations section (§ 61.03) of the General Provisions of 40 CFR Part 61.

An explanation of the International System of Units was presented in the FEDERAL REGISTER notice mentioned above (41 FR 54018). EPA is using the Standard for Metric Practice (E 380-76) published by the American Society for Testing and Materials (A.S.T.M.) as its basic reference. This document may be obtained by sending $4.00 to A.S.T.M., 1916 Race Street, Philadelphia, Pennsylvania 19103.

As this revision has no regulatory impact, but only defines units and abbreviations used in this part, opportunity for public participation was judged unnecessary.

This action is taken under the authority of sections 112 and 301(a) of the Clean Air Act, 42 U.S.C 1857g(a)

NOTE.—The Environmental Protection Agency has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Analysis under Executive Orders 11821 and 11949 and OMB Circular A-107.

Dated: September 26, 1977.

DOUGLAS M. COSTLE,
Administrator.

40 CFR Part 61 is amended by revising § 61.03 to read as follows:

§ 61.03 Units and abbreviations.

Used in this part are abbreviations and symbols of units of measure. These are defined as follows:

(a) System International (SI) units of measure:

A = ampere
g = gram
Hz = hertz
J = joule
K = degree Kelvin
kg = kilogram
m = meter
m^3 = cubic meter
mg = milligram = 10^{-3} gram
mm = millimeter = 10^{-3} meter
Mg = megagram = 10^{6} gram
mol = mole
N = newton
ng = nanogram = 10^{-9} gram
nm = nanometer = 10^{-9} meter
Pa = pascal
s = second
V = volt
W = watt
Ω = omh
μg = microgram = 10^{-6} gram

(b) Other units of measure:

°C = degree Celsius (centigrade)
cfm = cubic feet per minute
cc = cubic centimeter
d = day
°F = degree Fahrenheit
ft^2 = square feet
ft^3 = cubic feet
gal = gallon
in = inch
in Hg = inches of mercury
in H_2O = inches of water
l = liter
lb = pound
lpm = liter per minute
min = minute
ml = milliliter = 10^{-3} liter
oz = ounces
psig = pounds per square inch gage
°R = degree Rankine
μl = microliter = 10^{-6} liter
v/v = volume per volume
yd^2 = square yards
yr = year

(c) Chemical nomenclature:

Be = beryllium
Hg = mercury
H_2O = water

(d) Miscellaneous:

act = actual
avg = average
I.D. = inside diameter
M = molar
N = normal
O.D. = outside diameter
% = percent
std = standard

(Sections 112 and 301(a) of the Clean Air Act, as amended [42 U.S.C. 1857c-7, 1857g(a)].)

[FR Doc.77-28718 Filed 9-28-77;8:45 am]

43

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to the Commonwealth of Puerto Rico

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: A notice announcing EPA's delegation of authority for certain categories of the National Emission Standards for Hazardous Air Pollutants regulations to the Commonwealth of Puerto Rico is published at page 62196 of today's FEDERAL REGISTER. In order to reflect this delegation, this document amends EPA regulations to require the submission of all notices, reports, and other communications called for by the delegated regulations to the Commonwealth of Puerto Rico as well as to EPA.

EFFECTIVE DATE: December 9, 1977.

FOR FURTHER INFORMATION CONTACT:

J. Kevin Healy, Attorney, U.S. Environmental Protection Agency, Region II, General Enforcement Branch, Enforcement Division, 26 Federal Plaza, New York, N.Y. 10007, 212-264-1196.

SUPPLEMENTARY INFORMATION: By letter dated January 13, 1977 EPA delegated authority to the Commonwealth of Puerto Rico to implement and enforce many categories of the National Emission Standards for Hazardous Air Pollutants regulations. The Commonwealth accepted this delegation by letter dated October 17, 1977. A full account of the background to this action and of the exact terms of the delegation appears in the Notice of Delegation which is also being published in today's FEDERAL REGISTER.

This rulemaking is effective immediately, since the Administrator has found good cause to forego prior public notice. This addition of the Commonwealth of Puerto Rico address to the Code of Federal Regulations is a technical change and imposes no additional substantive burden on the parties affected.

Dated: November 22, 1977.

ECKARDT C. BECK,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

(1) In § 61.04 paragraph (b) is amended by revising subparagraph (BBB) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(AAA) * * *

(BBB)—Commonwealth of Puerto Rico Commonwealth of Puerto Rico Environmental Quality Board, P.O. Box 11785, Santurce, P.R. 00910.

* * * * *

[FR Doc.77-35163 Filed 12-8-77;8:45 am]

44

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 838-3]

AIR POLLUTION

Delegation of Authority to the State of Minnesota for Prevention of Significant Deterioration; Inspections, Monitoring and Entry; Standards of Performance for New Stationary Sources; and National Emission Standards for Hazardous Air Pollutants

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The amendment below institutes an address change for the implementation of technical and administrative review and enforcement of Prevention of Significant Deterioration provisions; Inspections, Monitoring and Entry provisions; Standards of Performance for New Stationary Sources; and National Emission Standards for Hazardous Air Pollutants. The notice announcing the delegation of authority is published elsewhere in this issue of the FEDERAL REGISTER.

EFFECTIVE DATE: October 6, 1977.

ADDRESSES: This amendment provides that all reports, requests, applications, and communications required for the delegated authority will no longer be sent to the U.S. Environmental Protection Agency, Region V Office, but will be sent instead to: Minnesota Pollution Control Agency, Division of Air Quality, 1935 West County Road B-2, Roseville, Minn. 55113.

FOR FURTHER INFORMATION, CONTACT:

Joel Morbito, Air Programs Branch, U.S. Environmental Protection Agency, Region V, 230 South Dearborn St., Chicago, Ill. 60604, 312-353-2205.

SUPPLEMENTARY INFORMATION: The Regional Administrator finds good cause for forgoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegations which are granted by this administrative amendment were effective October 6, 1977, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations. This rulemaking is effective immediately and is issued under authority of sections 101, 110, 111, 112, 114, 160-169 of the Clean Air Act, as amended (42 U.S.C. 7401, 7410, 7411, 7412, 7414,-7470-79, 7491). Accordingly, 40 CFR Parts 52, 60 and 61 are amended as follows:

PART 61—NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subpart A—General Provisions

1. Section 61.04 is amended by adding a new paragraph (b)(Y) as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(Y) Minnesota Pollution Control Agency, Division of Air Quality, 1935 West County Road B-2, Roseville, Minn. 55113.

Dated: December 21, 1977.

GEORGE ALEXANDER,
Regional Administrator.

[FR Doc.77-37404 Filed 12-30-77;8:45 am]

FEDERAL REGISTER, VOL. 43, NO. 1—TUESDAY, JANUARY 3, 1978

45

Title 40—Protection of Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

SUBCHAPTER C—AIR PROGRAMS

[FRL 846-7]

NEW SOURCE REVIEW

Delegation of Authority to the Commonwealth of Kentucky

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The amendments below institute certain address changes for reports and applications required from operators of new sources. EPA has delegated to the Commonwealth of Kentucky authority to review new and modified sources. The delegated authority includes the reviews under 40 CFR Part 52 for the prevention of significant deterioration. It also includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and reviewed under 40 CFR Part 61 for national emission standards for hazardous air pollutants. A notice announcing the delegation of authority was published in the Notices section of a previous issue of the FEDERAL REGISTER. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent to the Division of Air Pollution Control, Department for Natural Resources and Environmental Protection, West Frankfort Office Complex, U.S. 127, Frankfort, Ky. 40601, instead of EPA's Region IV.

EFFECTIVE DATE: January 25, 1978.

FOR FURTHER INFORMATION, CONTACT:

John Eagles, Air Programs Branch, Environmental Protection Agency, Region IV, 345 Courtland Street NE., Atlanta, Ga. 30308, phone 404-881-2864.

SUPPLEMENTARY INFORMATION: The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on April 12, 1977, and it serves no purpose to delay the technical change of this addition of the state address to the Code of Federal Regulations.

(Secs. 101, 110, 111, 112, 301, Clean Air Act, as amended, (42 U.S.C. 7401, 7410, 7411, 7412, 7601).)

Dated: January 10, 1978.

JOHN C. WHITE,
Regional Administrator.

* * * * *

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

4. In § 61.04, paragraph (b)(S) is added as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(S) Division of Air Pollution Control, Department for Natural Resources and Environmental Protection, U.S. 127, Frankfort, Ky. 40601.

* * * * *

[FR Doc. 78-2032 Filed 1-24-78; 8:45 am]

FEDERAL REGISTER, VOL. 43, NO. 17—WEDNESDAY, JANUARY 25, 1978

46

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Delaware

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This document amends regulations concerning air programs to reflect delegation to the State of Delaware of authority to implement and enforce certain National Emission Standards for Hazardous Air Pollutants.

EFFECTIVE DATE: February 16, 1978.

FOR FURTHER INFORMATION CONTACT:

Stephen R. Wassersug, Director, Enforcement Division, Environmental Protection Agency, Region III, 6th and Walnut Streets, Philadelphia, Pa. 19106, 215-597-4171.

SUPPLEMENTARY INFORMATION:

I. BACKGROUND

On September 7, 1977, the State of Delaware requested delegation of authority to implement and enforce certain National Emission Standards for Hazardous Air Pollutants. The request was reviewed and on September 30, 1977, a letter was sent to Pierre S. DuPont IV, Governor, State of Delaware, approving the delegation and outlining its conditions. The approval letter specified that if Governor DuPont or any other representative had any objections to the conditions of delegation they were to respond within ten (10) days after receipt of the letter. As of this date, no objections have been received.

II. REGULATIONS AFFECTED BY THIS DOCUMENT

Pursuant to the delegation of authority for National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Delaware on September 30, 1977, EPA is today amending 40 CFR 61.04, *Address*, to reflect this delegation. A Notice announcing this delegation was published on February 15, 1978, in the FEDERAL REGISTER. The amended § 61.04, which adds the address of the Delaware Department of Natural Resources and Environmental Control, to which all reports, requests applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

III. GENERAL

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this Administrative amendment was effective on September 30, 1977, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. § 1857c-7.

Dated: January 31, 1978.

JACK J. SCHRAMM,
Regional Administrator.

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising subparagraph (I) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)-(H) * * *

(I) State of Delaware (for asbestos, beryllium and mercury only): Delaware Department of Natural Resources and Environmental Control, Edward Tatnall Building, Dover, Delaware 19901.

[FR Doc. 78-4267 Filed 2-15-78; 8:45 am]

FEDERAL REGISTER, VOL. 43, NO. 33—THURSDAY, FEBRUARY, 16, 1978

47

Title 40—Protection of Environment

[FRL 846-2]

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Revision of Authority Citations

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This action amends the authority citations for Standards of Performance for New Stationary Sources and National Emission Stantards for Hazardous Pollutants. The amendment adopts the redesignation of classification numbers as changed in the 1977 amendments to the Clean Air Act. As amended, the Act formerly classified to 42 U.S.C. 1857 et seq. has been transferred and is now classified to 42 U.S.C. 7401 et seq.

EFFECTIVE DATE: March 3, 1978.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711 telephone 919-541-5271.

SUPPLEMENTARY INFORMATION: This action is being taken in accordance with the requirements of 1 CFR 21.43 and is authorized under section 301(a) of the Clean Air Act, as amended, 42 U.S.C. 7601(a). Because the amendments are clerical in nature and affect no substantive rights or requirements, the Administrator finds it unnecessary to propose and invite public comment.

Dated: February 24, 1978.

DOUGLAS M. COSTLE,
Administrator.

Parts 60 and 61 of Chapter I, Title 40 of the Code of Federal Regulations are revised as follows:

* * * * * *

4. The authority citation following the table of sections in part 61 is revised to read as follows:

AUTHORITY: Sec. 112, 301(a) of the Clean Air Act as amended [42 U.S.C. 7412, 7601(a)], unless otherwise noted.

§ 61.16 [Amended]

5. Following § 61.16, the following authority citation is added:

(Sec. 116, Clean Air Act as amended (42 U.S.C. 7416)).

§§ 61.09, 61.10, 61.12, 61.13, 61.14, 61.15, 61.24, 61.33, 61.34, 61.43, 61.44, 61.53, 61.54, 61.55, 61.67, 61.68, 61.69, 61.70, 61.71, and Appendices A and B [Amended]

5. The following authority citation is added to the above sections and appendices:

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414)).

[FR Doc. 78-5847 Filed 3-2-78; 8:45 am]

FEDERAL REGISTER, VOL. 43, NO. 43—FRIDAY, MARCH 3, 1978

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State/Local Air Pollution Control Agencies in Arizona, California, and Nevada

AGENCY: Environmental Protection Agency.

ACTION: Final rulemaking.

SUMMARY: The Environmental Protection Agency (EPA) is amending 40 CFR 61.04 *Address* by adding addresses of agencies to reflect new delegations of authority from EPA to certain state/local air pollution control agencies in Arizona, California, and Nevada. EPA has delegated authority to these agencies, as described in a notice appearing elsewhere in today's FEDERAL REGISTER, in order to implement and enforce the national emission standards for hazardous air pollutants.

EFFECTIVE DATE: May 16, 1978.

FOR FURTHER INFORMATION CONTACT:

Gerald Katz (E-4-3), Environmental Protection Agency, 215 Fremont Street, San Francisco, Calif. 94105, 415-556-8005.

Pursuant to delegation of authority for national standards for hazardous air pollutants (NESHAPS) to State/Local air pollution control agencies in Arizona, California, and Nevada from March 30, 1977, to January 30, 1978, EPA is today amending 40 CFR 61.04 *Address*, to reflect these actions. A notice announcing this delegation is published elsewhere in today's FEDERAL REGISTER. The amended § 61.04 is set forth below. It adds the address of the air pollution control agencies, to which must be addressed all reports, requests, applications, submittals, and communications pursuant to this part by sources subject to the NESHAPS located within these agencies' jurisdictions.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation actions which are reflected in this administrative amendment were effective on the dates of delegation and it serves no purpose to delay the technical change on these additions of the air pollution control agencies' addresses to the Code of Federal Regulations.

(Sec. 112, Clean Air Act, as amended (42 U.S.C. 7411).)

Dated: April 5, 1978.

SHAILA M. PRINDIVILLE,
Acting Regional Administrator,
EPA, Region IX.

Part 61 of chapter I, title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising subparagraphs D, F, and DD to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(D) Arizona.

Maricopa County Department of Health Services, Bureau of Air Pollution Control, 1825 East Roosevelt Street, Phoenix, Ariz. 85006.

Pima County Health Department, Air Quality Control District, 151 West Congress, Tucson, Ariz. 85701.

* * * * *

(F) California.

Bay Area Air Pollution Control District, 939 Ellis Street, San Francisco, Calif. 94109.

Del Norte County Air Pollution Control District, Courthouse, Crescent City, Calif. 95531.

Fresno County Air Pollution Control District, 515 South Cedar Avenue, Fresno, Calif. 93702

Humboldt County Air Pollution Control District, 5600 South Broadway, Eureka, Calif. 95501.

Kern County Air Pollution Control District, 1700 Flower Street (P.O. Box 997), Bakersfield, Calif. 93302.

Madera County Air Pollution Control District, 135 West Yosemite Avenue, Madera, Calif. 93637.

Mendocino County Air Pollution Control District, County Courthouse, Ukiah, Calif. 94582.

Monterey Bay Unified Air Pollution Control District, 420 Church Street (P.O. Box 487), Salinas, Calif. 93901.

Northern Sonoma County Air Pollution Control District, 3313 Chanate Road, Santa Rosa, Calif. 95404.

Sacramento County Air Pollution Control District, 3701 Branch Center Road, Sacramento, Calif. 95827.

San Diego County Air Pollution Control District, 9150 Chesapeake Drive, San Diego, Calif. 92123.

San Joaquin County Air Pollution Control District, 1601 East Hazelton Street (P.O. Box 2009), Stockton, Calif. 95201.

Santa Barbara County Air Pollution Control District, 4440 Calle Real, Santa Barbara, Calif. 93110.

Shasta County Air Pollution Control District, 1855 Placer Street, Redding, Calif. 96001.

South Coast Air Quality Management District, 9420 Telstar Avenue, El Monte, Calif. 91731.

Stanislaus County Air Pollution Control District, 820 Scenic Drive, Modesto, Calif. 95350.

Trinity County Air Pollution Control District, Box AJ, Weaverville, Calif. 96093.

Ventura County Air Pollution Control District, 625 East Santa Clara Street, Ventura, Calif. 93001.

* * * * *

(DD) Nevada.

Clark County, County District Health Department, Air Pollution Control Division, 625 Shadow Lane, Las Vegas, Nev. 89106.

Washoe County District Health Department, Division of Environmental Protection, 10 Kirman Avenue, Reno, Nev. 89502.

* * * * *

[FR Doc. 78-13012 Filed 5-15-78; 8:45 am]

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Title 40—Protection of the Environment

CHAPTER I—ENVIRONMENTAL PROTECTION AGENCY

[FRL 869-7]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Amendments to Asbestos Standard

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This rule amends the national emission standard for asbestos by extending the requirements of the provisions which apply to the spraying of asbestos-containing materials and to demolition and renovation operations. These amendments are a result of a determination that the standard did not require control of asbestos emissions during spray application of asbestos-containing materials other than fireproofing and insulation or during the demolition and renovation of structures where friable asbestos materials other than fireproofing and insulation are present.

EFFECTIVE DATE: June 19, 1978.

ADDRESS: A summary of the public comments on the proposed amendments and EPA's responses is contained in the Standards Support Document which may be obtained upon written request from the EPA Library (MD-35), Research Triangle Park, N.C. 27711 (specify *Standards Support Document: Promulgated Amendments to National Emission Standard for Asbestos*, EPA 450/2-77-030, January, 1978). The Standards Support Document is also available for public inspection and copying at the EPA Public Information Reference Unit, Room 2922 (EPA Library), 401 M Street SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone number 919-541-5271.

SUPPLEMENTARY INFORMATION: On March 2, 1977 (42 FR 12121), amendments to the national emission standard for asbestos were proposed under section 112 of the Clean Air Act. Interested persons participated in the rulemaking by submitting comments to EPA. The comments have been considered and, where determined by the Administrator to be appropriate, changes reflecting these comments have been incorporated into the promulgated amendments.

Under section 112(e) of the Clean Air Act, as amended in 1977, the Administrator may promulgate a "design, equipment, work practice, or operational standard, or combination thereof" for control of a hazardous air pollutant if it is infeasible to prescribe an emission standard under section 112(b) for the pollutant. Such infeasibility occurs, for example, when "a hazardous pollutant or pollutants cannot be emitted through a conveyance designed and constructed to emit or capture such a pollutant" or when "the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations." The spraying of friable asbestos materials and demolition or renovation of buildings containing such materials are sources of asbestos emissions for which EPA believes it is not feasible to prescribe a numerical emission standard. This is because asbestos cannot be emitted through a conveyance which readily captures emissions for measurement and because such measurement, in any event, would be technologically and economically impractical. Therefore, work practice standards rather than emission standards are being promulgated.

This promulgation is not affected by the Supreme Court decision in *Adamo Wrecking Co. v. U.S.* (No. 76-911, decided January 10, 1978). That case arose in the narrow context of a criminal enforcement proceeding and was decided on an interpretation of section 112 prior to its amendment in 1977. The court held that the pre-1977 version of section 112 did not authorize a portion of the national emission standard for asbestos (prescribing certain work practices for demolition and renovation activities) because it consisted of requirements other than numerical limitations on emissions. The 1977 amendments to section 112 now clearly authorize the Administrator to promulgate work practice or other nonnumerical standards in order to control emissions of hazardous air pollutants. Another important 1977 amendment to the Clean Air Act explicitly authorizes citizens and States, under section 304, to enforce work practice and other nonnumerical standards promulgated under section 112.

SUMMARY OF AMENDMENTS

The national emission standard for asbestos currently regulates demolition and renovation operations involving asbestos-containing insulation and fireproofing materials and prohibits the spray application of these materials if they contain more than 1 percent asbestos. The promulgated amendments extend coverage of the demolition and renovation provisions (40 CFR 61.22(d)) to all friable asbestos materials and extend the coverage of the asbestos spraying provisions (40 CFR 61.22(e)) to all materials which contain more than 1 percent asbestos. Materials in which the asbestos fibers are encapsulated with a bituminous or resinous binder and which are not friable after drying are exempt from the spraying provisions.

SUMMARY OF ENVIRONMENTAL AND ECONOMIC IMPACTS

The promulgated amendments to the asbestos standard will have a significant beneficial environmental impact by reducing emissions of asbestos to the atmosphere. There will be minimal solid waste and water pollution impacts from the increased amount of friable asbestos materials which must be removed and disposed of in conjunction with demolition or renovation. No impact on national energy consumption is anticipated.

The amendments to the demolition and renovation provisions may increase the cost of demolition or renovation because of the increased amount of friable asbestos-containing materials which will be covered by these regulations. Comments from representatives of the demolition industry, however, did not address this point. Therefore, this impact is not expected to be significant.

Spray-on asbestos-containing decorative coatings are the primary products prohibited by the amendments to the spraying restrictions. Since substitutes are available for these products, no significant adverse economic impacts are expected to result from prohibiting their use.

SIGNIFICANT COMMENTS

During the public comment period, EPA received 24 letters commenting on the proposed amendments. These included 16 from industry, 3 from other governmental agencies, and 5 from other interested parties. As a result of these comments, there has been only one significant change made to the amendments since proposal. This change involves the spraying restriction in § 61.22(e). The proposed amendments would have prohibited the spraying of all materials containing more than 1 percent asbestos by weight.

Several commenters, however, requested that EPA exempt from the spraying restrictions certain bituminous- and resinous-based asbestos-containing coatings. These coatings are typically used as roofing compounds, waterproofing of insulation exposed to the weather, automobile undercoatings, and industrial maintenance coatings.

Based on information supplied by the commenters, there are no acceptable substitutes available for these uses of asbestos. Among the most likely substitutes which have been investigated are glass, cotton, wood, cellulose, mineral wool, hemp, and other types of inorganic and organic fibers; gelling and thickening agents; clay thickeners, including attapulgite; ground cork; styrofoam; ground rubber; vermiculite; feldspar; polyethylene fibrous powders; and ceramic fibers. Generally, these substitutes have been found to be unacceptable because of unsatisfactory durability; insufficient bulk; unsatisfactory qualities related to fibrous reinforcing, homogeneity, and adhesiveness; agglomeration during spraying; and settlement in the container over time. Furthermore, if asbestos fibers are released during application of the coatings, during their service life, or during demolition or renovation, the fibers will not remain airborne because they are encapsulated by droplets of the binder and are too heavy to remain suspended.

Because there do not appear to be acceptable substitutes available and any beneficial environmental impact resulting from the prohibition of this use of asbestos would be negligible, the spraying of materials in which the asbestos fibers are encapsulated by a bituminous or resinous binder and which are not friable after drying is exempt from the provisions of § 61.22(e) of the promulgated amendments.

There were several other significant comments which did not result in changes to the amendments. To aid enforcement of the proposed spraying restrictions in § 61.22(e), commenters suggested that products should be labeled as to their asbestos content if they contain in excess of 1 percent asbestos by dry weight and have the potential for spray-on application. Requiring labeling would constitute a significant change in the amendments and would require reproposal. Rather than reproposing, the need for this provision will be assessed during enforcement of the amendments and, if appropriate, labeling requirements will be proposed.

One commenter suggested that the regulation be extended to require removal of existing asbestos-containing sprayed materials which present significant risks to human health due to deterioration, particularly in buildings accessible to the public. The proposed amendments would have only prohibited the future application of asbestos-containing spray material.

This problem is being addressed through the preparation of a guidance document which will assist governmental agencies and private individuals who must decide on proper action to take when sprayed asbestos materials are found in existing buildings. The first volume of this document discusses criteria for determining whether asbestos material in a building is a problem; the current knowledge of hazards from spray-on asbestos in buildings; and alternative corrective actions that may be taken, including acceptable removal procedures and the use of sealants for the coating of material. The second volume of the document, which is expected to be available in late 1978, will present the results of studies which will be done on sealants to determine their effectiveness and acceptability for coating asbestos materials. Copies of the first volume of this document may be obtained upon written request from the Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711 (specify *Sprayed Asbestos-Containing Materials in Buildings: A Guidance Document*).

The lack of EPA reference methods for making various asbestos measurements was of concern to some commenters. Specifically, they suggested that EPA publish a method for determining the percentage of asbestos in spray materials and reference OSHA-NIOSH procedures for measuring airborne asbestos particulate matter from spraying operations.

A number of methods for the analysis of asbestos-containing samples are now in use and the variability of results obtained by these methods is extremely wide. In an attempt to standardize procedures and reduce this variability, an EPA provisional electron microscope procedure for measuring the concentration of asbestos in air samples has been developed. This method can also be used for analysis of material samples. It will be further evaluated and refined for use in actual field studies and it found acceptable, may eventually serve as the basis for an EPA reference method. The procedure is available in a publication entitled Electron Microscope Measurement of Airborne Asbestos Concentrations: A Provisional Methodology Manual, EPA 600/2-77-178, August 1977. Copies of this document may be obtained upon written request from the Environmental Sciences Research Laboratory (MD-49), EPA, Research Triangle Park, N.C. 27711.

The OSHA-NIOSH method measures airborne asbestos fiber concentrations by phase contrast microscopy. It measures only those fibers which are longer than 5 microns and does not differentiate between asbestos and other fibers. While such a method may be sufficient for enforcing the OSHA workplace asbestos standard, it is not sufficient as an indicator of total asbestos concentration in the ambient air. Many asbestos fibers are smaller than the smallest measured by the OSHA-NIOSH method and these fibers can contribute significantly to the amount of asbestos which may be present in the ambient air. The provisional electron microscope method described above is useful for estimating airborne asbestos fiber concentrations with greater precision.

Some commenters suggested that since asbestos is a carcinogen and no threshold level for health effects has been established, the 1 percent allowable asbestos content for spray-on materials permits too much environmental contamination and should be lowered considerably, if not completely eliminated. The 1 percent allowable asbestos content was selected primarily to allow the spray application of materials which contain trace amounts of asbestos which occur in numerous natural substances and which could not be reduced or eliminated without effectively banning the use of these materials.

MISCELLANEOUS

NOTE.—The Environmental Protection Agency has determined that this document does not contain a major action requiring preparation of an Economic Impact Analysis under Executive Orders 11821 and 11949 and OMB Circular A-107.

Dated: June 13, 1978.

BARBARA BLUM,
Acting Administrator.

In Part 61 of Chapter I, Title 40, of the Code of Federal Regulations, §§ 61.21 and 61.22 are amended as follows:

Subpart B—National Emission Standard for Asbestos

1. Section 61.21 is amended by revising paragraphs (m), (q), and (r) to read as follows:

§ 61.21 Definitions.

* * * * *

(m) "Renovation" means the removing or stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member. Operations in which load-supporting structural members are wrecked or taken out are excluded.

* * * * *

(q) "Removing" means taking out friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member from any building, structure, facility, or installation.

(r) "Stripping" means taking off friable asbestos materials from any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member.

* * * * *

2. Section 61.22 is amended by revising paragraphs (d), (d)(1)(i), (d)(1)(ii),

(d)(2)(iii), (d)(4)(i), (d)(4)(ii), (d)(4)(iii), (d)(4)(iv), (e), and (e)(2); and adding paragraph (e)(3) to read as follows:

§ 61.22 Emission standard.

* * * * *

(d) *Demolition and renovation.* The requirements of this paragraph shall apply to any owner or operator of a demolition or renovation operation who intends to demolish any institutional, commercial, or industrial building (including apartment buildings having more than four dwelling units), structure, facility, installation, or portion thereof which contains any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that is covered or coated with friable asbestos materials, except as provided in paragraph (d)(1) of this section; or who intends to renovate any institutional, commercial, or industrial building, structure, facility, installation, or portion thereof where more than 80 meters (ca. 260 feet) of pipe covered or coated with friable asbestos materials are stripped or removed, or more than 15 square meters, (ca. 160 square feet) of friable asbestos materials used to cover or coat any duct, boiler, tank, reactor, turbine, furnace, or structural member are stripped or removed.

(1) (i) The owner or operator of a demolition operation is exempted from the requirements of this paragraph: *Provided,* (A) The amount of friable asbestos materials in the building or portion thereof to be demolished is less than 80 meters (ca. 260 feet) used on pipes, and less than 15 square meters (ca. 160 square feet) used on any duct, boiler, tank, reactor, turbine, furnace, or structural member, and (B) the notification requirements of paragraph (d)(1)(ii) are met.

(ii) Written notification shall be postmarked or delivered to the Administrator at least 20 days prior to commencement of demolition and shall include the information required by paragraph (d)(2) of this section, with the exception of the information required by paragraphs (d)(2) (iii), (vi), (vii), (viii), and (ix) of this section, and shall state the measured or estimated amount of friable asbestos materials which is present. Techniques of estimation shall be explained.

(2) * * *

(iii) Description of the building, structure, facility, or installation to be demolished or renovated, including the size, age, and prior use of the structure, and the approximate amount of friable asbestos materials present.

* * * * *

(4) * * *

(i) Friable asbestos materials, used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member, shall be removed from any building, structure, facility or installation subject to this paragraph. Such removal shall occur before wrecking or dismantling of any portion of such building, structure, facility, or installation that would break up the friable asbestos materials and before wrecking or dismantling of any other portion of such building, structure, facility, or installation, that would preclude access to such materials for subsequent removal. Removal of friable asbestos materials used on any pipe, duct, or structural member which are encased in concrete or other similar structural material is not required prior to demolition, but such materials shall be adequately wetted whenever exposed during demolition.

(ii) Friable asbestos materials used on pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members shall be adequately wetted during stripping, except as provided in paragraphs (d)(4)(iv), (d)(4)(vi), or (d)(vii) of this section.

(iii) Pipes, ducts, boilers, tanks, reactors, turbines, furnaces, or structural members that are covered or coated with friable asbestos materials may be taken out of any building, structure, facility, or installation subject to this paragraph as units or in sections provided the friable asbestos materials exposed during cutting or disjoining are adequately wetted during the cutting or disjoining operation. Such units shall not be dropped or thrown to the ground, but shall be carefully lowered to ground level.

(iv) The stripping of friable asbestos materials used on any pipe, duct, boiler, tank, reactor, turbine, furnace, or structural member that has been removed as a unit or in sections as provided in paragraph (d)(4)(iii) of this section shall be performed in accordance with paragraph (d)(4)(ii) of this section. Rather than comply with the wetting requirement, a local exhaust ventilation and collection system may be used to prevent emissions to the outside air. Such local exhaust ventilation systems shall be designed and operated to capture the asbestos particulate matter produced by the stripping of friable asbestos materials. There shall be no visible emissions to the outside air from such local exhaust ventilation and collection systems except as provided in paragraph (f) of this section.

* * * * *

(e) *Spraying.* There shall be no visible emissions to the outside air from the spray-on application of materials containing more than 1 percent asbestos, on a dry weight basis, used on equipment and machinery, except as provided in paragraph (f) of this section. Materials sprayed on buildings, structures, structural members, pipes, and conduits shall contain less than 1 percent asbestos on a dry weight basis.

* * * * *

(2) Any owner or operator who intends to spray asbestos materials which contain more than 1 percent asbestos on a dry weight basis on equipment and machinery shall report such intention to the Administrator at least 20 days prior to the commencement of the spraying operation. Such report shall include the following information: * * *

(3) The spray-on application of materials in which the asbestos fibers are encapsulated with a bituminous or resinous binder during spraying and which are not friable after drying is exempted from the requirements of paragraphs (e) and (e)(2) of this section.

* * * * *

(Secs. 112 and 301(a) of the Clean Air Act as amended (42 U.S.C. 7412, 7601(a)).)

[FR Doc. 78-16891 Filed 6-16-78; 8:45 am]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority for State of Rhode Island

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amendment.

SUMMARY: The delegation of authority to the State of Rhode Island for national emissions standards for hazardous air pollutants (NESHAPS) was made on March 31, 1978. This amendment, which adds the address of the Rhode Island Department of Environmental Management, reflects this delegation. A notice announcing this delegation is published today in the FEDERAL REGISTER.

EFFECTIVE DATE: October 16, 1978.

FOR FURTHER INFORMATION CONTACT:

John Courcier, Air Branch, EPA Region I, Room 2113, JFK Federal Building, Boston, Mass. 02203, 617-223-4448.

SUPPLEMENTARY INFORMATION: Under the delegation of authority for the national emission standards for hazardous air pollutants (NESHAPS) to the State of Rhode Island on March 31, 1978, EPA is today amending 40 CFR 61.04, Address, to reflect this delegation. A notice announcing this delegation is published today elsewhere in this part of the FEDERAL REGISTER. The amended § 61.04, which adds the address of the Rhode Island Department of Environmental Management to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on March 31, 1978, and it serves no purpose to delay the technical change of this addition of the State address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of section 112 of the Clean Air Act, as amended, 42 U.S.C. 7411.

Date: September 18, 1978.

WILLIAM R. ADAMS, Jr.,
Regional Administrator,
Region I.

Part 61 of chapter I, title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04 paragraph (b) is amended by adding subparagraph (OO) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(OO) State of Rhode Island, Department of Environmental Management, 83 Park Street, Providence, R.I. 02908

[FR Doc. 78-29106 Filed 10-13-78; 8:49 am]

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Delegation of Authority to State of Texas

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This action amends Section 61.4, *Address*, to reflect the delegation of authority for the National Emission Standards for Hazardous Air Pollutants (NESHAPS) to the State of Texas.

EFFECTIVE DATE: February 7, 1979.

FOR FURTHER INFORMATION CONTACT:

James Veach, Enforcement Division, Region 6, Environmental Protection Agency, First International Building, 1201 Elm Street, Dallas, Texas 75270, telephone (214) 767-2760.

SUPPLEMENTARY INFORMATION: A notice announcing the delegation of authority is published elsewhere in the Notice Section in this issue of the FEDERAL REGISTER. These amendments provide that all reports and communications previously submitted to the Administrator, will now be sent to the Texas Air Control Board, 8520 Shoal Creek Boulevard, Austin, Texas, instead of EPA's Region 6.

As this action is not one of substantive content, but is only an administrative change, public participation was judged unnecessary.

(Sections 112 and 301(a) of the Clean Air Act; Section 4(a) of Public Law 91-604, 84 Stat. 1685; Section 2 of Public Law 90-148, 81 Stat. 504 [42 U.S.C. 7412 and 7601(a)]).

Dated: November 15, 1[illegible]

ADLANE H[illegible],
Regional Administrator,
[illegible] 6.

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

In § 61.04, paragraph (b) (SS) is amended as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(SS) State of Texas, Texas Air Control Board, 8520 Shoal Creek Boulevard, Austin, Texas 78758.

* * * * *

[FR Doc. 79-4228 Filed 2-6-79; 8:45 am]

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40 CFR Part 61

[FRL 1328-1]

National Emission Standards for Hazardous Air Pollutants; General Provisions; Definitions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final Rule.

SUMMARY: This document makes some editorial changes and rearranges the definitions alphabetically in Subpart A—General Provisions of 40 CFR Part 61. An alphabetical list of definitions will be easier to update and to use.

EFFECTIVE DATE: September 25, 1979.

FOR FURTHER INFORMATION CONTACT: Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), U. S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5271.

SUPPLEMENTARY INFORMATION: The "Definitions" section (§ 61.02) of the General Provisions of 40 CFR Part 61 now lists definitions by paragraph designations. Due to the anticipated increase in the number of definitions to be added to the General Provisions in the future, continued use of the present system of adding definitions by paragraph designations at the end of the list could become administratively cumbersome and could make the list difficult to use. Therefore, paragraph designations are being eliminated and the definitions are rearranged alphabetically. New definitions will be added to § 61.02 of the General Provisions in alphabetical order automatically.

Since this rule simply reorganizes existing provisions and has no regulatory impact, it is not subject to the procedural requirements of Executive Order 12044.

Dated: September 19, 1979.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

40 CFR 61.02 is amended by removing all paragraph designations and by rearranging the definitions in alphabetical order as follows:

§ 61.02 Definitions.

The terms used in this part are defined in the Act or in this section as follows:

"Act" means the Clean Air Act (42 U.S.C. 1857 et seq.).

"Administrator" means the Administrator of the Environmental Protection Agency or his authorized representative.

"Alternative method" means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for his determination of compliance.

"Commenced" means, with respect to the definition of "new source" in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

"Compliance schedule" means the date or dates by which a source or category of sources is required to comply with the standards of this part and with any steps toward such compliance which are set forth in a waiver of compliance under § 61.11.

"Construction" means fabrication, erection, or installation of an affected facility.

"Effective date" is the date of promulgation in the **Federal Register** of an applicable standard or other regulation under this part.

"Equivalent method" means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

"Existing source" means any stationary source which is not a new source.

"Modification" means any physical change in, or change in the method of operation of, a stationary source which increases the amount of any hazardous air pollutant emitted by such source or which results in the emission of any hazardous air pollutant not previously emitted, except that:

(a) Routine maintenance, repair, and replacement shall not be considered physical changes, and

(b) The following shall not be considered a change in the method of operation:

(1) An increase in the production rate, if such increase does not exceed the operating design capacity of the stationary source;

(2) An increase in hours of operation.

"New source" means any stationary source, the construction or modification of which is commenced after the publication in the **Federal Register** of proposed national emission standards for hazardous air pollutants which will be applicable to such source.

"Owner or operator" means any person who owns, leases, operates, controls, or supervises a stationary source.

"Reference method" means any method of sampling and analyzing for an air pollutant, as described in Appendix B to this part.

"Standard" means a national emission standard for a hazardous air pollutant proposed or promulgated under this part.

"Startup" means the setting in operation of a stationary source for any purpose.

"Stationary source" means any building, structure, facility, or installation which emits or may emit any air pollutant which has been designated as hazardous by the Administrator.

(Sec. 112, 301(a), Clean Air Act as amended (42 U.S.C. 7412 and 7601(a)))

[FR Doc. 79-29708 Filed 9-24-79; 8:45 am]

Federal Register / Vol. 44, No. 220 / Tuesday, November 13, 1979 / Rules and Regulations

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1356-2]

National Emission Standards for Hazardous Air Pollutants; General Provisions

AGENCY: U.S. Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: This amendment institutes an address change for the implementation of technical and administrative review and enforcement of the National Emission Standards for Hazardous Air Pollutants. The notice announcing the delegation of authority is published elsewhere in this issue of the Federal Register.

EFFECTIVE DATE: Effective November 13, 1979.

ADDRESSES: All reports, requests, applications and communications required pursuant to 40 CFR 61.10 for the Counties in Ohio listed below are to be submitted to the Regional Air Pollution Agency, Montgomery County Combined General Health District, 451 West Third Street, Dayton, Ohio 45402. Copies of these reports shall also be submitted to U.S. EPA, Region V, Enforcement Division, 230 South Dearborn Street, Chicago, Illinois 60604.

FOR FURTHER INFORMATION CONTACT: Debra Marcantonio, USEPA Air Programs Branch, U.S. Environmental Protection Agency, Region V, 230 South Dearborn Street, Chicago, Illinois 60604. (312) 886-6048.

SUPPLEMENTARY INFORMATION: The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation became effective September 11, 1979. Therefore, it serves no purpose to delay the technical change of this addition of an address to the Code of Federal Regulations. This rulemaking is effective immediately and is issued under authority of Section 112 of the Clean Air Act. (42 U.S.C. 7412)

Section 61.04 of Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended by adding a new paragraph (b)(kk) as follows:

Subpart A—General Provisions

§ 61.04 is amended as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(kk) Ohio

Montgomery County: Regional Air Pollution Control Agency, Montgomery County Combined General Health District, 451 West Third Street, Dayton, Ohio 45402.

Clarke, Darke, Greene, Miami and Preble Counties [except for all information required under § 61.22 (d) and (e)]: Montgomery County Combined General Health District, 451 West Third Street, Dayton, Ohio 45402.

* * * * *

Dated: November 2, 1979.

John McGuire,

Regional Administrator.

[FR Doc. 79-34683 Filed 11-9-79; 8:45 am]

Federal Register / Vol. 45, No. 41 / Thursday, February 28, 1980 /

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1411-5]

National Emission Standards for Hazardous Air Pollutants; Delegation of Authority to the State of Maryland

AGENCY: Environmental Protection Agency.

ACTION: Final Rulemaking.

SUMMARY: Pursuant to the delegation of authority for National Emissions Standards for Hazardous Air Pollutants [NESHAPS] to the State of Maryland on October 9, 1979, EPA is today amending 40 CFR 61.04, Address to reflect this delegation.

EFFECTIVE DATE: February 28, 1980.

FOR FURTHER INFORMATION CONTACT: Thomas Shiland, (215) 597-7915 EPA, Region III (Curtis Building), 6th & Walnut Streets, Philadelphia, Pennsylvania 19106.

SUPPLEMENTARY INFORMATION: A Notice announcing this delegation is published today elsewhere in the Federal Register. The amended 61.04 which adds the address of the Maryland Bureau of Air Quality to which all reports, requests, applications, submittals, and communications to the Administrator pursuant to this part must also be addressed, is set forth below.

The Administrator finds good cause for foregoing prior public Notice and for making this rulemaking effective immediately in that it is an Administrative change and not one of substantive content. No additional burdens are imposed on the parties affected. The delegation which is reflected by the Administrative amendment was effective on October 9, 1979, and it serves no purpose to delay the technical change of this address to the Code of Federal Regulations.

This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended, 42 U.S.C. § 7412.

Dated: January 28, 1980.

R. Sarah Compton,

Director, Enforcement Division.

Part 61 of Chapter I, Title 40 of the *Code of Federal Regulations* is amended as follows:

1. In § 61.04 paragraph (b) is amended by revising Subparagraph V to read as follows:

§ 61.04 Address

* * * * *

(b) * * *

(V) State of Maryland, Bureau of Air Quality and Noise Control, Maryland State Department of Health and Mental Hygiene, 201 West Preston Street, Baltimore, Maryland 21201.

[FR Doc. 80-6197 Filed 2-27-80; 8:45 am]

Federal Register / Vol. 46, No. 96 / Tuesday, May 19, 1981 / Rules and Regulations

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40 CFR Parts 60 and 61

[A-7-FRL-1830-2]

New Source Performance Standards; Delegation of Authority to the State of Missouri and Addition of Address

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rulemaking.

SUMMARY: The Missouri Department of Natural Resources (MDNR) has been delegated authority to implement and enforce the federal New Source Performance Standards (NSPS) regulations for 30 stationary source categories and national emission standards for five hazardous air pollutants. Notification of this delegation is published today elsewhere in the **Federal Register**. This document adds the address of the MDNR to which all reports, requests, applications, submittals, and communications to the Administrator, as required by 40 CFR Part 60 and 40 CFR Part 61, must also be addressed.

EFFECTIVE DATE: May 19, 1981.

FOR FURTHER INFORMATION CONTACT: Mr. Charles W. Whitmore, Air, Noise and Radiation Branch, U.S. Environmental Protection Agency, Region VII, 324 E. 11th Street, Kansas City, Missouri 64106, (816) 374-6525; FTS 758-6525.

SUPPLEMENTARY INFORMATION: The MDNR has been delegated authority to implement and enforce the federal New Source Performance Standards (NSPS) regulations for 30 stationary source categories and national emission standards for five hazardous air pollutants. Notification of this delegation is published today elsewhere in the **Federal Register**. The amended 40 CFR 60.4(b)(AA), and 40 CFR 61.04(b)(AA) adds the address of the MDNR to which all reports, requests, applications, submittals, and communications to the Administrator, as required by 40 CFR Part 60 and 40 CFR Part 61, must also be addressed.

The Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an Administrative change and not one of substantive content. No additional burdens are imposed upon the parties affected.

The delegation which influenced this Administrative amendment was effective on December 16, 1980, and it serves no purpose to delay the technical change of this address in the Code of Federal Regulations. This rulemaking is effective immediately, and is issued under the authority of Section 111 of the Clean Air Act, as amended. 42 U.S.C. § 7412.

Dated: May 4, 1981.

William W. Rice

Acting Regional Administrator, Region VII.

* * * * *

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by revising subparagraph (AA) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(AA) Missouri Department of Natural Resources, Post Office Box 1368, Jefferson City, Missouri 65101.

* * * * *

[FR Doc. 81-14000 Filed 5-18-81; 8:45 am]

Federal Register / Vol. 46, No. 104 / Monday, June 1, 1981 / Rules and Regulations

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ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 60 and 61

[A-4-FRL-1830-8]

Air Pollution; New Source Review; Delegation of Authority to the State of Tennessee

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The amendments below institute certain address changes for reports and applications required from operators of certain sources subject to Federal regulations. EPA has delegated to the State of Tennessee authority to review new and modified sources. The delegated authority includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants. A notice announcing the delegation of authority is published in the Notices section of this issue of the Federal Register. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent to the Division of Air Pollution Control, Tennessee Department of Public Health, 256 Capitol Hill Building, Nashville, Tennessee 37219.

EFFECTIVE DATE: April 11, 1980.

FOR FURTHER INFORMATION CONTACT: Mr. Raymond S. Gregory, Air Programs Branch, Environmental Protection Agency, Region IV, 345 Courtland Street, N.E., Atlanta, Georgia 30366, phone 404/881-3286.

SUPPLEMENTARY INFORMATION: The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an adminstrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on April 11, 1980, and it serves no purpose to delay the technical change of this addition of the state address to the Code of Federal Regulations.

The Office of Management and Budget has exempted this regulation from the OMB review requirements of Executive Order 12291 pursuant to Section 8(b) of that order.

(Secs. 101, 110, 111, 112, 301, Clean Air Act, as amended. (42 U.S.C. 7401, 7410, 7411, 7412, 7601))

Dated: May 3, 1981.

John A. Little,

Acting Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

In § 61.04, paragraph (b) (RR) is added as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(RR) Division of Air Pollution Control,
Tennessee Department of Public Health,
256 Capitol Hill Building, Nashville,
Tennessee 37219

[FR Doc. 81-16206 Filed 5-29-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60 and 61

[A-7-FRL 1888-1]

New Source Performance Standards and National Emission Standards for Hazardous Pollutants; Delegation of Authority to the State of Nebraska and Change of Address

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rulemaking.

SUMMARY: The EPA is today amending its regulations on standards of performance for new stationary sources of air pollution and National Emission Standards for Hazardous Air Pollutants (NESHAPS) to reflect a change of address of the Nebraska Department of Environmental Control (DEC) and the Region VII office of the EPA, and to reflect a delegation to the DEC of NESHAPS.

EFFECTIVE DATE: July 31, 1981.

FOR FURTHER INFORMATION CONTACT: Steve A. Kovac, Air, Noise and Radiation Branch, U.S. Environmental Protection Agency, Region VII, 324 East 11th Street, Kansas City, Missouri 64106; 816/374-6525; FTS 758-6525.

SUPPLEMENTARY INFORMATION: The DEC has been delegated authority to implement and enforce the federal New Source Performance Standards (NSPS) regulations for 25 stationary source categories and national emission standards for four hazardous air pollutants. An original delegation of 12 source categories was published in the **Federal Register** on December 30, 1976. A second delegation, affecting 13 additional source categories and four hazardous air pollutants, is published today elsewhere in the **Federal Register**. The amended § 60.4(a) and § 61.04(a) correct the address of the Region VII office of the EPA. The amended § 60.4(b) corrects the address of the DEC to which all reports, requests, applications, submittals, and communications to the Administrator, as required by 40 CFR Part 60, must also be submitted. The amended § 61.04(b) adds the address of the DEC to which information to the Administrator, as required by 40 CFR Part 61, must also be submitted.

The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional burdens are imposed upon the parties affected.

The delegation which influenced this Administrative amendment was effective on July 22, 1981, and it serves no purpose to delay the technical change of this address in the Code of Federal Regulations. This rulemaking is effective immediately, and is issued under the authority of Section 111 of the Clean Air Act, as amended, 42 U.S.C. 7412.

Under Executive Order 12291, EPA must judge whether a rule is "major" and, therefore, subject to the requirements of a Regulatory Impact Analysis. This rule is not a "major" rule, because it only corrects and supplements addresses to which sources are required to submit reports under existing requirements. Thus, it is unlikely to have an annual effect on the economy of $100 million or more or to have other significant adverse impacts on the national economy.

This rule was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291.

Dated: June 7, 1981.

William W. Rice,

Acting Regional Administrator, Region VII.

Part 60 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

1. In § 60.4, paragraph (a) the address for Region VII is revised:

§ 60.4 Address.

(a) * * *

Region VII (Iowa, Kansas, Missouri, Nebraska), 324 East 11th Street, Kansas City, Missouri 64106.

* * * * *

2. In § 60.4, paragraph (b) is amended by revising paragraph (CC) to read as follows:

§ 60.4 Address.

* * * * *

(b) * * *

(CC) State of Nebraska, Nebraska Department of Environmental Control, P.O. Box 94877, State House Station, Lincoln, Nebraska 68509.

* * * * *

PART 61—NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANT

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (a) the address for Region VII is revised:

§ 61.04 Address.

(a) * * *

Region VII (Iowa, Kansas, Missouri, Nebraska), 324 East 11th Street, Kansas City, Missouri 64106.

2. In § 61.04, paragraph (b) is amended by adding Subparagraph (CC) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(CC) State of Nebraska, Nebraska Department of Environmental Control, P.O. Box 94877, State House Station, Lincoln, Nebraska 68509.

* * * * *

[FR Doc. 81-22350 Filed 7-30-81; 8:45 am]

58

40 CFR Parts 60 and 61

[A-9-FRL-1875-2]

Standards of Performance for New Stationary Sources (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS); Delegation of Authority to State of California

AGENCY: Environmental Protection Agency.

ACTION: Notice of final rulemaking.

SUMMARY: The Environmental Protection Agency is amending its regulations on Standards of Performance for New Stationary Sources (NSPS) and the National Emission Standards for Hazardous Air Pollutants (NESHAPS). The rules delegate authority to implement and enforce the NSPS and NESHAPS programs to 19 state and local air pollution control agencies in California. These delegations are being issued under the Clean Air Act which requires the Administrator to delegate this type of authority to any State or local agency that submits adequate procedures for implementation and enforcement.

DATES: The amendments to the list of addresses of Air Pollution Control Districts in 40 CFR 60.4(b)(F) and 61.04(b)(F) are effective October 8, 1981. Delegation of pollutant categories to each Air Pollution Control District is effective as of the date of delegation shown in the table in §§ 60.4(b)(F)(1) and 61.04(F)(1).

FOR FURTHER INFORMATION CONTACT: David Solomon, Permits Branch, Environmental Protection Agency, Region 9, 215 Fremont Street, San Francisco, CA 94105; Attn: E-4-2 (415) 556-8005.

SUPPLEMENTARY INFORMATION: Sections 111(c) (NSPS) and 112(d) (NESHAPS) of the Clean Air Act require the Administrator of EPA to delegate authority to implement and enforce NSPS and NESHAPS to any state or local agency that submits adequate procedures. Pursuant to Sections 111(c) and 112(d), EPA, Region 9, has delegated authority to implement and enforce the NSPS and NESHAPS programs to various state and local agencies in California.

The NSPS and NESHAPS programs are delegated by each category of pollutant, not by the total program. A request for delegation of authority for each pollutant category is submitted by a state or local agency to EPA where it is reviewed and delegated if it meets the proper standards.

Pursuant to the Administrative Procedure Act, 5 U.S.C. 553(b), EPA has, in the past, in addition to informing the state or local agency, published notices of delegation in the **Federal Register**. However, these notices did not specify which particular pollutant category had been delegated.

The primary purpose of this action is to rectify any ambiguities that might exist concerning which agencies have previously been delegated the authority to administer a particular pollutant category and to rectify any omissions EPA has made in publishing past notices of delegation in the **Federal Register**.

This notice lists, in tabular form, only Air Pollution Control Districts that are affected by this notice. The table lists the specific category or categories of pollutant that the District has been delegated authority over. In addition, a list of addresses which revises and adds new addresses of Air Pollution Control Districts to the list found in 40 CFR 60.4(b)(F) and 61.04(b)(F).

Pursuant to NSPS and NESHAPS regulations, sources are required to submit all required reports to the state or local agency that has jurisdiction over the source, and to EPA.

The Administrator finds good cause to forego prior public notice and to make this rulemaking effective immediately. It is an administrative change, not one of substantive content, and imposes no additional burdens on the parties affected.

The delegation actions reflected in this administrative amendment were effective on the dates of delegation, which appear in the table. No useful purpose would be served by delaying the technical changes included herein.

Regulatory Impact: Pursuant to Executive Order 12291, EPA must determine whether a newly promulgated regulation is "major" and therefore subject to the requirements of a Regulatory Impact Analysis. This rule is not a major regulation because it neither creates new responsibilities nor adversely affects the economy in any significant way. Nor is this regulation a new rule *per se*. It is merely a rule providing public notice of past delegations that previously were not published in the **Federal Register** and listing the specific pollutant categories that have been so delegated.

This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291.

(Secs. 111 and 112 of the Clean Air Act, as amended, (42 U.S.C. 1857C-6 and 1857C-7))

Dated: July 30, 1981.

Anne M. Gorsuch,

Administrator.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subparts A of Parts 60 and 61 of Chapter I, Title 40 of the Code of Federal Regulations are amended as follows:

1. Sections 60.4(b)(F) and 61.04(b)(F) are each amended by revising the addresses of the following Air Pollution Control Districts.

§ 60.4 Address.

§ 61.04 Address.

* * * * *

(b) * * *

(F) California.

Del Norte County Air Pollution Control District, 909 Highway 101 North, Crescent City, CA 95531

Fresno County Air Pollution Control District, P.O. Box 11867, 1246 L Street, Fresno, CA 93721

Monterey Bay Unified Air Pollution Control District, 1270 Natividad Road, Room 105, Salinas, CA 93906

Northern Sonoma County Air Pollution Control District, 134 "A" Avenue, Auburn, CA 95448

Santa Barbara County Air Pollution Control District, 300 North San Antonio Road, Santa Barbara, CA 93110

Shasta County Air Pollution Control District, 2650 Hospital Lane, Redding, CA 96001

South Coast Air Quality Management District, 9150 Flair Drive, El Monte, CA 91731

Stanislaus County Air Pollution Control District, 1030 Scenic Drive, Modesto, CA 95350

Trinity County Air Pollution Control District, P.O. Box AK, Weaverville, CA 96093

Ventura County Air Pollution Control District, 800 South Victoria Avenue, Ventura, CA 93009

2. Sections 60.4(b)(F) and 61.04(b)(F) are further amended by adding the

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addresses of the following Air Pollution Control Districts.

§§ 60.4 and 61.04 [Amended]

* * * * *

(b) * * *

(F) California.

Amador County Air Pollution Control District, P.O. Box 430, 810 Court Street, Jackson, CA 95642
Butte County Air Pollution Control District, P.O. Box 1229, 316 Nelson Avenue, Oroville, CA 95965
Calaveras County Air Pollution Control District, Government Center, El Dorado Road, San Andreas, CA 95249
Colusa County Air Pollution Control District, 751 Fremont Street, Colusa, CA 95952
El Dorado Air Pollution Control District, 330 Fair Lane, Placerville, CA 95667
Glenn County Air Pollution Control District, P.O. Box 351, 720 North Colusa Street, Willows, CA 95988
Great Basin Unified Air Pollution Control District, 863 North Main Street, Suite 213, Bishop, CA 93514
Imperial County Air Pollution Control District, County Services Building, 939 West Main Street, El Centro, CA 92243
Kings County Air Pollution Control District, 330 Campus Drive, Hanford, CA 93230
Lake County Air Pollution Control District, 255 North Forbes Street, Lakeport, CA 95453
Lassen County Air Pollution Control District, 175 Russell Avenue, Susanville, CA 96130
Mariposa County Air Pollution Control District, Box 5, Mariposa, CA 95338
Merced County Air Pollution Control District, P.O. Box 471, 240 East 15th Street, Merced, CA 95340
Modoc County Air Pollution Control District, 202 West 4th Street, Alturas, CA 96101
Nevada County Air Pollution Control District, H.E.W. Complex, Nevada City, CA 95959
Placer County Air Pollution Control District, 11491 "B" Avenue, Auburn, CA 95603
Plumas County Air Pollution Control District, P.O. Box 480, Quincy, CA 95971
San Bernardino County Air Pollution Control District, 15579–8th, Victorville, CA 92392
San Luis Obispo County Air Pollution Control District, P.O. Box 637, San Luis Obispo, CA 93406
Sierra County Air Pollution Control District, P.O. Box 286, Downieville, CA 95936
Siskiyou County Air Pollution Control District, 525 South Foothill Drive, Yreka, CA 96097
Sutter County Air Pollution Control District, Sutter County Office Building, 142 Garden Highway, Yuba City, CA 95991
Tehama County Air Pollution Control District, P.O. Box 38, 1750 Walnut Street, Red Bluff, CA 96080
Tulare County Air Pollution Control District, County Civic Center, Visalia, CA 93277
Tuolumne County Air Pollution Control District, 9 North Washington Street, Sonora, CA 95370
Yolo-Solano Air Pollution Control District, P.O. Box 1006, 323 First Street, #5, Woodland, CA 95695

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59

40 CFR Parts 60 and 61

[A-6-FRL-2057-1]

New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants; Delegation of Authority to the State of Arkansas

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA has delegated the authority for implementation and enforcement of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (except demolition and renovation of buildings containing asbestos) to the Arkansas Department of Pollution Control and Ecology (ADPCE). The State specified in its request that delegation of authority for demolition and renovation of buildings containing asbestos, would not be accepted. Except as specifically limited, all of the authority and responsibilities of the Administrator or the Regional Administrator which are found in 40 CFR Part 60 and 40 CFR Part 61 are delegated to the ADPCE. Any of such authority and responsibilities may be redelegated by the Department to its Director or staff.

EFFECTIVE DATE: September 14, 1981.

ADDRESS: Copies of the State request and State-EPA agreement for delegation of authority are available for public inspection at the Air Branch, Environmental Protection Agency, Region 6, First International Building, 28th Floor, 1201 Elm Street, Dallas, Texas 75270; (214) 767–1594 or (FTS) 729–1594.

FOR FURTHER INFORMATION CONTACT: William H. Taylor, Air Branch, address above, Telephone: (214) 767–1594 or (FTS) 729–1594.

SUPPLEMENTARY INFORMATION: On July 1, 1981, the State of Arkansas submitted to EPA, Region 6, a request for delegation of authority to the ADPCE for the implementation and enforcement of the NSPS and NESHAP programs (except demolition and renovation of buildings containing asbestos). After a thorough review of the request and information submitted, the Regional Administrator determined that the State's pertinent laws and the rules and regulations of the ADPCE were found to provide an adequate and effective procedure for implementation and enforcement of the NSPS and NESHAP programs.

Under Executive Order 12291, EPA must judge whether a publication is "major" and therefore subject to the requirements of a regulatory impact analysis. The delegation of authority is not "major", because it is an administrative change, and no additional burdens are imposed on the parties affected.

The delegation letter to Arkansas was submitted to OMB and determined not to be a major rule under E.O. 12291.

Effective immediately, all information pursuant to 40 CFR 60 and 61 by sources locating in the State of Arkansas should be submitted to the State agency at the following address: Arkansas Department of Pollution Control and Ecology, 8001 National Drive, Little Rock, Arkansas 72209.

(Secs. 101 and 301 of the Clean Air Act, as amended (42 U.S.C. 7401 and 7601))

Dated: February 2, 1982.

Frances E. Phillips,

Acting Regional Administrator.

* * * * *

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter 1, Title 40 of the Code of Federal Regulations is amended as follows:

Section 61.04 paragraph (b) is amended by revising subparagraph (E) to read as follows:

§ 61.4 Address.

* * * * *

(b) * * *

(E) State of Arkansas, Program Administrator, Air and Hazardous Materials Division, Arkansas Department of Pollution Control and Ecology, 8001 National Drive, Little Rock, Arkansas 72209 (with the exception of (1)(d) Demolition and Renovation of Buildings Containing Asbestos)."

* * * * *

[FR Doc. 82-4701 Filed 2-19-82; 8:45 am]

60

40 CFR Part 61

[A-7-FRL-2076-7]

National Emission Standards for Hazardous Pollutants; Delegation of Authority to the State of Iowa and Addition of Address

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rulemaking.

SUMMARY: The EPA is today amending 40 CFR 61.04(b)(Q). Address, to reflect a delegation of authority to the Iowa Department of Environmental Quality (IDEQ). The IDEQ has been delegated authority to implement and enforce the federal National Emission Standards for Hazardous Air Pollutants (NESHAPS) for source catagories involving four pollutants (asbestos, beryllium, mercury and vinyl chloride). Notification of this delegation is published today elsewhere in the **Federal Register**. The amended 40 CFDR 61.04(b)(Q) adds this address of the IDEQ to which all reports, requests, applications, submittals, and communications to the Administrator, as required by 40 CFR Part 61, must also be addressed.

EFFECTIVE DATE: March 18, 1982.

FOR FURTHER INFORMATION CONTACT: Mr. Charles W. Whitmore, Air Branch, U.S. Environmental Protection Agency, Region VII, 324 East 11th Street, Kansas City, Missouri 64106, 816/374-6525; FTS 758-6525.

SUPPLEMENTARY INFORMATION: The administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an Administrative change and not one of substantive content. No additional burdens are imposed upon the parties affected.

The delegation which influenced this administrative amendment was effective on January 19, 1982, and it serves no purpose to delay the technical change of this address in the Code of Federal Regulations. This rulemaking is effective immediately, and is issued under the authority of Section 112 of the Clean Air Act, as amended. The Office of Management and Budget has exempted the underlying action in this rulemaking from the requirement of Section 3 of Executive Order 12291.

Dated: March 5, 1982.

John J. Franke, Jr.,

Regional Administrator, Region VII.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

1. In § 61.04, paragraph (b) is amended by adding subparagraph (Q) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

* * * * *

(Q) Iowa Department of Environmental Quality, Henry A. Wallace Building, 900 East Grand, Des Moines, Iowa 50316.

* * * * *

[FR Doc. 82-7863 Filed 3-17-82; 10:46 am]

Federal Register / Vol. 47, No. 57 / Wednesday, March 24, 1982 / Rules and Regulations

61

40 CFR Parts 60 and 61

[A-4-FRL-2060-3]

Standards of Performance for New Stationary Sources National Emission Standards for Hazardous Air Pollutants; Mississippi: Delegation of Authority

AGENCY: Environmental Protection Agency.

ACTION: Final rule.

SUMMARY: The amendments institute certain address changes for reports and applications required from operators of certain sources subject to Federal regulations. EPA has delegated to the State of Mississippi authority to review new and modified sources. The delegated authority includes the review under 40 CFR Part 60 for the standards of performance for new stationary sources and review under 40 CFR Part 61 for national emission standards for hazardous air pollutants. A notice announcing the delegation of authority was published in the Notices section of the March 22, 1982 issue of the Federal Register. These amendments provide that all reports, requests, applications, submittals, and communications previously required for the delegated reviews will now be sent to the Bureau of Pollution Control, Department of Natural Resources, P.O. Box 10385, Jackson, Mississippi 39209.

EFFECTIVE DATE: November 30, 1981.

FOR FURTHER INFORMATION CONTACT: Ms. Denise W. Pack, Air Programs Branch, Environmental Protection Agency, Region IV, 345 Courtland Street, N.E., Atlanta, Georgia 30365, phone 404/881-3286.

SUPPLEMENTARY INFORMATION: The Regional Administrator finds good cause for foregoing prior public notice and for making this rulemaking effective immediately in that it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on November 30, 1981, and it serves no purpose to delay the technical change of this addition of the state address to the Code of Federal Regulations.

The Office of Management and Budget has exempted this regulation from the OMB review requirements of Executive Order 12291 pursuant to Section 3(b) of that order.

(Secs. 101, 110, 111, 112, 301, Clean Air Act, as amended. (42 U.S.C. 7401, 7411, 7412, 7601))

Dated: March 3, 1982.

Charles R. Jeter,

Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40, Code of Federal Regulations, is amended as follows:

In § 61.04, paragraph (b)(Z) is added as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(Z) Bureau of Pollution Control, Department of Natural Resources, P.O. Box 10385, Jackson, Mississippi 39209.

Federal Register / Vol. 47, No. 78 / Thursday, April 22, 1982 / Rules and Regulations

62

40 CFR Parts 60 and 61

[A-6-FRL-2103-6]

New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Delegation of Authority to the State of Oklahoma

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: EPA, Region 6, has delegated the authority for implementation and enforcement of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants to the Oklahoma State Department of Health (OSDH). Except as specifically limited, all of the authority and responsibilities of the Administrator or the Regional Administrator which are found in 40 CFR Part 60 and 40 CFR Part 61 are delegated to the OSDH. Any of such authority and responsibilities may be redelegated by the Department to its Director or staff.

EFFECTIVE DATE: March 25, 1982.

ADDRESS: Copies of the State request and State-EPA agreement for delegation of authority are available for public inspection at the Air Branch, Environmental Protection Agency, Region 6, First International Building, 28th Floor, 1201 Elm Street, Dallas, Texas 75270; (214) 767-1594 or (FTS) 729-1594.

FOR FURTHER INFORMATION CONTACT: William H. Taylor, Air Branch, address above; (214) 767-1594 or FTS 729-1594.

SUPPLEMENTARY INFORMATION: On December 18, 1980, the State of Oklahoma submitted to EPA, Region 6, a request for delegation of authority to the OSDH for the implementation and enforcement of the NSPS and NESHAP programs. After a thorough review of the request and information submitted, the Regional Administrator determined that the State's pertinent laws and the rules and regulations of the OSDH were found to provide an adequate and effective procedure for implementation and enforcement of the NSPS and NESHAP programs.

The Office of Management and Budget has exempted this information notice from the requirements of Section 3 of Executive Order 12291.

Effective immediately, all information pursuant to 40 CFR 60 and 40 CFR 61 by sources locating in the State of Oklahoma should be submitted to the State agency at the following address: Oklahoma State Department of Health, Air Quality Service, P.O. Box 53551, Oklahoma City, Oklahoma 73152.

This delegation is issued under the authority of Sections 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 7411 and 7412).

Dated: April 7, 1982.

Dick Whittington,

Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter 1, Title 40 of the Code of Federal Regulations is amended as follows:

Section 61.04 is amended by revising paragraph (b)(LL) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(LL) State of Oklahoma, Oklahoma State Department of Health, Air Quality Service, P.O. Box 53551, Oklahoma City, Oklahoma 73152.

* * * * *

[FR Doc. 82-10809 Filed 4-21-82; 8:45 am]

63

40 CFR Parts 60 and 61

[A-3-FRL-2112-1]

New Source Performance Standards and National Emission Standards for Hazardous Pollutants; Delegation of Authority to the State of Delaware

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This document amends EPA regulations which state the address of the Delaware Department of Natural Resources and Environmental Control to reflect delegation to the State of Delaware of authority to implement and enforce additional Standards of Performance for New Stationary Sources and National Emission Standards for Hazardous Air Pollutants.

EFFECTIVE DATE: April 27, 1982.

FOR FURTHER INFORMATION CONTACT: Laurence Budney (3AW12), Environmental Protection Agency, Region III, Curtis Bldg., 6th & Walnut Sts., Philadelphia, PA 19106, Telephone: (215) 597-2842.

SUPPLEMENTARY INFORMATION:

I. Background

On September 22, 1981 and February 3, 1982, John E. Wilson III, Secretary of the Delaware Department of Natural Resources and Environmental Control, submitted requests for delegation of authority to implement and enforce regulations for:

- New Source Performance Standards (NSPS) for stationary gas turbines
- New Source Performance Standards (NSPS) for petroleum refineries
- National Emission Standards for Hazardous Air Pollutants (NESHAP) for vinyl chloride

The request was reviewed and on April 15, 1982 a letter was sent to John E. Wilson III, Secretary, Department of Natural Resources and Environmental Control, approving the delegation and outlining its conditions. The approval letter specified that if Secretary Wilson or any other representatives had any objections to the conditions of the delegation they were to respond within ten (10) days after receipt of the letter. As of this date, no objections have been received.

II. Regulations Affected by This Document

With respect to the authority delegations referred to above, EPA is today amending 40 CFR 60.4 and 61.04, Address, to reflect these delegations. The amended § 60.4 and § 61.04 which state the address of the Delaware Department of Natural Resources and Environmental Control (to which all reports, requests, applications, submittals and communications to the Administrator regarding this subpart must be addressed), is set forth below.

The Administrator finds good cause to make this rulemaking effective immediately without prior public notice since it is an administrative change and not one of substantive content. No additional substantive burdens are imposed on the parties affected. The delegation which is reflected by this administrative amendment was effective on April 15, 1982.

This rulemaking is effective immediately, and is issued under the authority of Sections 111 and 112 of the Clean Air Act, as amended.

The Office of Management and Budget has exempted this action from Executive Order 12291.

III. List of Subjects in 40 CFR Part 60

Air pollution control, Aluminum, Ammonium sulfate plants, Cement industry, Coal, Copper, Electric power plants, Glass and glass products, Grains, Intergovernmental relations, Iron, Lead, Metals, Motor vehicles, Nitric acid plants, Paper and paper products industry, Petroleum, Phosphate, Sewage disposal, Steel, Sulfuric acid plants, Waste treatment and disposal, Zinc.

IV. List of Subjects in 40 CFR Part 61

Air pollution control, Asbestos, Beryllium, Hazardous materials, Mercury, Vinyl chloride.

(42 U.S.C. 7401 et seq.)

Dated: April 15, 1982.

Stephen R. Wassersug,

Director, Air & Waste Management Division.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

In § 61.04, paragraph (b) is amended by revising subparagraph (I) to read as follows:

§ 61.04 Address.

* * * * *

(b) * * *

(A)–(H) * * *

(I) State of Delaware (for asbestos, beryllium, mercury and vinyl chloride):

Delaware Department of Natural Resources and Environmental Control, Tatnall Building, P.O. Box 1401, Dover, Delaware 19901

[FR Doc. 82-11479 Filed 4-26-82; 8:45 am]

64

40 CFR Parts 60 and 61

[A-10-FRL-2119-7]

New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants; Subdelegation of Authority to an Oregon Local Agency

AGENCY: Environmental Protection Agency (EPA).

ACTION: Rule.

SUMMARY: EPA is today approving a request dated March 11, 1982 from the State of Oregon Department of Environmental Quality for subdelegation to enforce certain New Source Performance Standards and National Emissions Standards for Hazardous Air Pollutants to the Lane Regional Air Pollution Authority.

DATE: April 23, 1982.

ADDRESSES: The related material in support of this subdelegation may be examined during normal business hours at the following locations:

Central Docket Section (10A-82-4), West Tower Lobby, Gallery I, Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460

Air Programs Branch, Environmental Protection Agency, 1200 Sixth Avenue, Seattle, Washington 98101

State of Oregon, Department of Environmental Quality, 522 S.W. Fifth Avenue, Portland, Oregon 97207.

FOR FURTHER INFORMATION CONTACT: Mark H. Hooper, Environmental Protection Agency, 1200 Sixth Avenue, Seattle, Washington 98101, Telephone: (206) 442-1949, FTS: 399-1949

SUPPLEMENTARY INFORMATION: Pursuant to section 111(c)(1) and 112(d) of the Clean Air Act, as amended, the Regional Administrator of Region 10, Environmental Protection Agency (EPA), delegated to the State of Oregon on November 10, 1975, and December 3, 1981, the authority to implement and enforce the program for New Source Performance (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS). The delegation was announced in the **Federal Register** on February 20, 1976 and December 22, 1981 (41 FR 7749 and 46 FR 62086), respectively.

On March 11, 1982, the State of Oregon Department of Environmental Quality requested EPA's concurrence in the State's subdelegation of the NSPS and NESHAPS program to the Lane Regional Air Pollution Authority. After reviewing the State's request, the Regional Administrator determined that the subdelegation met all the requirements outlined in EPA's delegations. Therefore, the Regional Administrator on April 23, 1982, concurred in the subdelegation to the local agency listed below with the stipulation that all the conditions placed on the original delegation to the State shall also apply to the subdelegation to the local agency. EPA is today amending 40 CFR 60.4 and 61.4 to reflect the State's subdelegation.

This rulemaking is effective April 23, 1982 and is issued under the authority of section 111(c)(1) and 112(d) of the Clean Air Act, as amended (42 U.S.C. 1857c-7).

Dated: April 23, 1982.

John R. Spencer,

Regional Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

Section 61.4 is amended by adding paragraph (b)(MM)(viii):

§ 61.04 Address.

* * * * *

(b) * * *

(MM) * * *

(viii) Lane Regional Air Pollution Authority, 1244 Walnut Street, Eugene, Oregon 97403.

[FR Doc. 82-12881 Filed 5-11-82; 8:45 am]

65

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 60 and 61

[A-6-FRL-2128-6]

Delegation of Additional Authority to the State of Arkansas for New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP)

AGENCY: Environmental Protection Agency.

ACTION: Information notice.

SUMMARY: On September 14, 1981, EPA delegated the authority for implementation and enforcement of existing New Source Performance Standards and National Emission Standards of Hazardous Air Pollutants (except demolition and renovation of buildings containing asbestos) to the State of Arkansas.

On March 11, 1982, the Arkansas Department of Pollution Control and Ecology (ADPCE) requested delegation of authority to implement and enforce future NSPS and NESHAP requirements. On March 25, 1982, EPA granted this additional authority to ADPCE by modifying Condition 4 of the NSPS/NESHAP delegation agreement.

EFFECTIVE DATE: March 25, 1982.

ADDRESS: Copies of the State request and State/EPA agreement for delegation of authority are available for public inspection at the Air Branch, Air and Waste Management Division, Environmental Protection Agency, Region 6, First International Building, 28th Floor, 1201 Elm Street, Dallas, Texas 75270.

FOR FURTHER INFORMATION CONTACT: William H. Taylor, Jr., Chief, Technical Section, Air Branch, address above, telephone (214) 767-1594 or (FTS) 729-1594.

SUPPLEMENTARY INFORMATION: On March 11, 1982, the State of Arkansas submitted to EPA, Region 6, a request for delegation of additional authority to the ADPCE for the implementation and enforcement of future NSPS and NESHAP programs. After a through review of the request and information submitted, the Regional Administrator determined that the State's pertinent laws and the rules and regulations of the ADPCE were adequate and effective to implement and enforce future NSPS and NESHAP requirements. Therefore, Condition 4 of the NSPS/NESHAP agreement letter was amended on March 25, 1982, as follows:

> 4. The Arkansas Department of Pollution Control and Ecology is authorize to implement and enforce all future NSPS and NESHAP requirements without making a written request to EPA, subject to the delegation conditions and terms as set forth in the delegation agreement letter dated September 14, 1981.

Under Executive Order 12291, EPA must judge whether a publication is "major" and therefore subject to the requirements of a regulatory impact analysis. The delegation of authority is not "major", because it is an administrative change, and no additional burdens are imposed on the parties affected.

The Office of Management and Budget has exempted this action from the requirements of Section 3 of Executive Order 12291.

This delegation is issued under the authority of sections 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 7411 and 7412).

Dated: April 29, 1982

Frances E. Phillips,

Regional Administrator.

[FR Doc. 82-13006 Filed 5-20-82; 8:45 am]

66

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL 2087-8]

National Emission Standards for Hazardous Air Pollutants; Appendix B—Test Methods; Revisions and Addition

March 10, 1982.

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Revisions to Methods 101 and 102, "Determination of Particulate and Gaseous Mercury Emissions from Chlor-Alkali Plants—Air Streams," and "Determination of Particulate and Gaseous Mercury Emissions from Chlor-Alkali Plants—Hydrogen Streams," respectively, and a new Method 111, "Determination of Particulate and Gaseous Mercury Emissions from sewage Sludge Incinerators," were proposed in the **Federal Register** on October 15, 1980 (45 FR 68514). This action promulgates the revisions and the new method, redesignated as Method 101A. The intended effect is to require all chlor-alkali plants and sewage sludge treatment plants specified to conduct emissions tests under Subparts A and E of 40 CFR Part 61 to hereafter (see effective date listed below) use these new and revised methods for determining compliance. In addition, amendments to Subparts A and E are made to include new Method 101A.

EFFECTIVE DATE: June 8, 1982.

Under section 307(b)(1) of the Clean Air Act, judicial review of the revisions and addition is available *only* by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

ADDRESSES: *Summary of Comments and Responses.* This document for the promulgated test methods may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Revisions to Methods 101, 101A, and 102 for the Determination of Mercury Emissions (Proposed October 15, 1980, 45 FR 68514)—Summary of Comments and Responses, EPA 450/3-82-008." The document contains (1) a summary of all the public comments made on the proposed test methods with the Administrator's response to the comments, and (2) a summary of the changes made to the test methods since proposal.

Docket. A docket, number A-79-45, containing information considered by EPA in development of the promulgated test methods, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section (A-130), West Tower Lobby, Gallery 1, 401 M Street, S.W., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Roger T. Shigehara, Emission Measurement Branch, Emission Standards and Engineering Division (MD-19), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-2237.

Public Participation

The test methods were proposed and published in the **Federal Register** on October 15, 1980 (45 FR 68514). To provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed test methods, a public hearing was scheduled for November 6, 1980, at the Research Triangle Park, North Carolina, but no person desired to make an oral presentation. The public comment period was from November 6, 1980, to December 15, 1980, and was extended to February 13, 1981. Five comment letters were received concerning issues relative to the proposed test methods. The comments have been carefully considered and, where determined to be appropriate by the Administrator, changes have been made in the proposed test methods.

Significant Comments and Changes to the Proposed Test Methods

Five comment letters were received on the proposed test methods. A detailed discussion of these comments and responses can be found in the background information document which is referred to in the **ADDRESSES** section of this preamble. The summary of comments and responses serves as the basis for the revisions which have been made to the test methods between proposal and promulgation. The major comments and responses are summarized in this preamble. Most of the comment letters contained multiple comments. The significant comments and subsequent method changes are listed according to the affected method.

Method 101

One commenter cited success from the extensive use of $KMnO_4$ as the mercury absorbing medium and suggested it serve as an acceptable alternative to iodine monochloride. This substitution will be allowed, as long as the entire system can meet the performance specifications that have been added to the methods.

It was pointed out that section 7.3.2 is confusing as written and seems to indicate that separate flasks should be pipetted during the dilution. This has been corrected by rewording the first two sentences to read "Pipet a 2-ml aliquot from the diluted sample from 7.3.1 into a 250-ml volumetric flask. Add 10 ml of 5 percent H_2SO_4 and adjust the volume to exactly 250 ml with deionized distilled water."

In section 9.4, the total mercury weight ($C_{Hg(AC)}$) was originally listed as mercury concentration. This correction has been made.

Methods 101, 101A, and 102

Because of their similarities, several of the received comments pertained to all three methods. Most concerned the use of various alternative sampling and analysis equipment which are reported to give results that are as accurate and precise as the apparatus specified in the methods. An equipment performance specification has been incorporated into the methods allowing such alternative systems to be used as long as they meet these performance criteria.

The use of dried, mercury-free air will be allowed as an optional aeration gas in place of dried nitrogen. The asbestos gasket specified for the probe nozzle and the asbestos insulation tape specified for the optical cell have been replaced by fiberglass components.

Borosilicate glass containers are specified for use in preparing and storing all mercury standard solutions.

Docket

The docket is an organized and complete file of all the information considered by EPA in the development of this rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process. Along with the statement of basis and purpose of the proposed and promulgated test methods and EPA responses to significant comments, the contents of the docket will serve as the record in case of judicial review [section 307(d)(7)(A)].

Miscellaneous

This rulemaking does not impose any additional emission measurement requirements on facilities affected by this rulemaking, nor does it change the emission standard or make it more stringent. Rather, this rulemaking revises the test methods to which the affected facilities are already subject. If future standards impose emission measurement requirements, the impacts of the revised test methods promulgated today will be evaluated during development of these standards.

Under Executive Order 12291, EPA must judge whether a regulation is "major" and, therefore, subject to the requirement of a regulatory impact analysis. This regulation is not major because it will not have an annual effect on the economy of $100 million or more; it will not result in a major increase in costs or prices; and there will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of U.S.-based enterprises to compete with foreign-based enterprises in domestic or export markets.

This rule was submitted to the Office of Management and Budget for review under Executive Order 12291.

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that the attached rule will not have a significant economic impact on a substantial number of small entities.

This rulemaking is issued under the authority of sections 112, 114, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7412, 7414, and 7601(a)).

List of Subjects in 40 CFR Part 61

Air pollution control, Asbestos, Beryllium, Hazardous materials, Mercury, Vinyl chloride.

Dated: May 28, 1982.

Anne M. Gorsuch,

Administrator.

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

40 CFR Part 61 is amended as follows:

1. By revising § 61.14(a) as follows:

Subpart A—General Provisions

* * * * *

§ 61.14 Source test and analytical methods.

(a) Methods 101, 101A, 102, and 104 in Appendix B to this part shall be used for all source tests required under this part, unless an equivalent method or an alternative method has been approved by the Administrator.

* * * * *

2. By revising § 61.53(d)(2) as follows:

§ 61.53 Stack sampling

* * * * *

(d) * * *

(2) Method 101A in Appendix B to this part shall be used to test emissions as follows:

(i) The test shall be performed within 90 days of the effective date of these regulations in the case of an existing source or a new source which has an initial startup date preceding the effective date.

(ii) The test shall be performed within 90 days of startup in the case of a new source which did not have an initial startup date preceding the effective date.

* * * * *

3. By revising Methods 101 and 102 and adding Method 101A to Appendix B as follows:

Appendix B—Test Methods

Method 101—Determination of Particulate and Gaseous Mercury Emissions From Chlor-Alkali Plants—Air Streams

1. *Applicability and Principle*—1.1 *Applicability.* This method applies to the determination of particulate and gaseous mercury (Hg) emissions from chlor-alkali plants and other sources (as specified in the regulations), where the carrier-gas stream in the duct or stack is principally air.

1.2 *Principle.* Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic iodine monochloride (ICl) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry.

2. *Range and Sensitivity*—2.1 *Range.* After initial dilution, the range of this method is 0.5 to 120 μg Hg/ml. The upper limit can be extended by further dilution of the sample.

2.2 *Sensitivity.* The sensitivity of this method depends on the recorder/spectrophotometer combination selected.

3. *Interfering Agents*—3.1 *Sampling.* SO_2 reduces ICl and causes premature depletion of the ICl solution.

3.2 *Analysis.* ICl concentrations greater than 10^{-4} molar inhibit the reduction of the Hg (II) ion in the aeration cell. Condensation of water vapor on the optical cell windows causes a positive interference.

4. *Precision and Accuracy*—The following estimates are based on collaborative tests, wherein 13 laboratories performed duplicate analyses on two Hg-containing samples from a chlor-alkali plant and on one laboratory-prepared sample of known Hg concentration. The concentration ranged from 2 to 65 μg Hg/ml.

4.1 *Precision.* The estimated within-laboratory and between-laboratory standard deviations are 1.6 and 1.8 μg Hg/ml, respectively.

4.2 *Accuracy.* The participating laboratories that analyzed a 64.3–μg Hg/ml (in 0.1 M ICl) standard obtained a mean of 63.7 μg Hg/ml.

5. *Apparatus*—5.1 *Sampling Train.* A schematic of the sampling train is shown in Figure 101–1; it is similar to the Method 5 train (mention of Method 5 refers to Parts 60 of 40 CFR). The sampling train consists of the following components:

5.1.1 *Probe Nozzle, Pitot Tube, Differential Pressure Gauge, Metering System, Barometer, and Gas Density Determination Equipment.* Same as Method 5, Sections 2.1.1, 2.1.3, 2.1.4, 2.1.8, 2.1.9, and 2.1.10, respectively.

5.1.2 *Probe Liner.* Borosilicate or quartz glass tubing. The tester may use a heating system capable of maintaining a gas temperature of 120±14° C (248±25° F) at the probe exit during sampling to prevent water condensation.

Note.—Do not use metal probe liners.

5.1.3 *Impingers*. Four Greenburg-Smith impingers connected in series with leak-free ground glass fittings or any similar leak-free noncontaminating fittings. For the first, third, and fourth impingers, the tester may use impingers that are modified by replacing the tip with a 13-mm-ID (0.5-in.) glass tube extending to 13 mm (0.5 in.) from the bottom of the flask.

5.1.4 *Acid Trap*. Mine Safety Appliances air line filter, Catalog number 81857, with acid absorbing cartridge and suitable connections, or equivalent.

5.2 *Sample Recovery*. The following items are needed:

5.2.1 *Glass Sample Bottles*. Leakless, with Teflon-lined caps, 1000- and 100-ml.

5.2.2 *Graduated Cylinder*. 250-ml.

5.2.3 *Funnel and Rubber Policeman*. To aid in transfer of silica gel to container; not necessary if silica gel is weighed in the field.

5.2.4 *Funnel*. Glass, to aid in sample recovery.

5.3 *Sample Preparation and Analysis*. The following equipment is needed:

5.3.1 *Atomic Absorption Spectrophotometer*. Perkin-Elmer 303, or equivalent, containing a hollow-cathode mercury lamp and the optical cell described in Section 5.3.2.

5.3.2 *Optical Cell*. Cylindrical shape with quartz end windows and having the dimensions shown in Figure 101–2. Wind the cell with approximately 2 meters of 24-gauge nichrome heating wire, and wrap with fiberglass insulation tape or equivalent; do not let the wires touch each other.

5.3.3 *Aeration Cell*. Constructed according to the specifications in Figure 101–3. Do not use a glass frit as a substitute for the blown glass bubbler tip shown in Figure 101–3.

5.3.4 *Recorder*. Matched to output of the spectrophotometer described in Section 5.3.1.

5.3.5 *Variable Transformer*. To vary the voltage on the optical cell from 0 to 40 volts.

5.3.6 *Hood*. For venting optical cell exhaust.

5.3.7 *Flowmetering Valve*.

5.3.8 *Flowmeter*. Rotameter or equivalent, capable of measuring a gas flow of 1.5 liters/min.

5.3.9 *Aeration Gas Cylinder*. Nitrogen or dry, Hg-free air, equipped with a single-stage regulator.

5.3.10 *Connecting Tubing*. Use glass tubing (ungreased ball- and socket-connections are recommended) for all tubing connections between the solution cell and the optical cell; do not use Tygon tubing, other types of flexible tubing, or metal tubing as substitutes. The tester may use Teflon, steel, or copper tubing between the nitrogen tank and flowmetering valve (5.3.7), and Tygon, gum, or rubber tubing between the flowmetering valve and the aeration cell.

5.3.11 *Flow Rate Calibration Equipment*. Bubble flowmeter or wet test meter for measuring a gas flow rate of 1.5±0.1 liters/min.

5.3.12 *Volumetric Flasks*. Class A with penny head standard taper stoppers; 100-, 250-, 500- and 1000-ml.

5.3.13 *Volumetric Pipets*. Class A; 1-, 2-, 3-, 4-, and 5-ml.

5.3.14 *Graduated Cylinder*. 50-ml.

5.3.15 *Magentic Stirrer*. General-purpose laboratory type.

5.3.16 *Magnetic Stirring Bar*. Teflon-coated.

5.3.17 *Balance*. Capable of weighing to ±0.5 g.

5.4 *Alternative Analytical Apparatus*. Alternative systems are allowable as long as they meet the following criteria:

5.4.1 A linear calibration curve is generated and two consecutive samples of the same aliquot size and concentration agree within 3 percent of their average.

5.4.2 A minimum of 95 percent of the spike is recovered when an aliquot of a source sample is spiked with a known concentration of mercury (II) compound.

5.4.3 The reducing agent should be added after the aeration cell is closed.

5.4.4 The aeration bottle bubbler should not contain a frit.

5.4.5 Any Tygon used should be as short as possible and conditioned prior to use until blanks and standards yield linear and reproducible results.

5.4.6 If manual stirring is done before aeration, it should be done with the aeration cell closed.

5.4.7 A drying tube should not be used unless it is conditioned as the Tygon above.

6. *Reagents*—Use ACS reagent-grade chemicals or equivalent, unless otherwise specified.

6.1 *Sampling and Recovery*. The reagents used in sampling and recovery are as follows:

6.1.1 *Water*. Deionized distilled, meeting ASTM Specifications for Type I Reagent Water—ASTM Test Method D 1193–74. If high concentrations of organic matter are not expected to be present, the analyst may eliminate the $KMnO_4$ test for oxidizable organic matter. Use this water in all dilutions and solution preparations.

6.1.2 *Nitric Acid (HNO_3), 50 Percent (V/V)*. Mix equal volumes of concentrated HNO_3 and deionized distilled water, being careful to slowly add the acid to the water.

6.1.3 *Silica Gel*. Indicating type, 6- to 16-mesh. If previously used, dry at 175° C (350° F) for 2 hours. The tester may use new silica gel as received.

6.1.4 *Potassium Iodide (KI) Solution, 25 Percent*. Dissolve 250 g of KI in deionized distilled water and dilute to 1 liter.

6.1.5 *Iodine Monochloride (ICl) Stock Solution, 1.0 M*. To 800 ml of 25 percent KI solution, add 800 ml of concentrated hydrochloric acid (HCl). Cool to room temperature. With vigorous stirring, slowly add 135 g of potassium iodate (KIO_3) and stir until all free iodine has dissolved. A clear orange-red solution occurs when all the KIO_3 has been added. Cool to room temperature and dilute to 1800 ml with deionized distilled water. Keep the solution in amber glass bottles to prevent degradation.

6.1.6 *Absorbing Solution, 0.1 M ICl*. Dilute 100 ml of the 1.0 M ICl stock solution to 1 liter with deionized distilled water. Keep the solution in amber glass bottles and in darkness to prevent degradation. This reagent is stable for at least 2 months.

6.2 *Sample Preparation and Analysis*. The reagents needed are listed below:

6.2.1 *Tin (II) Solution*. Prepare fresh daily and keep sealed when not being used. Completely dissolve 20 g of tin (II) chloride [or 25 g of tin (II) sulfate] crystals (Baker Analyzed reagent grade or any other brand that will give a clear solution) in 25 ml of concentrated HCl. Dilute to 250 ml with deionized distilled water. Do not substitute HNO_3, H_2SO_4, or other strong acids for the HCl.

6.2.2 *Mercury Stock Solution, 1 mg Hg/ml*. Prepare and store all mercury standard solutions in borosilicate glass containers. Completely dissolve 0.1354 g of mercury (II) chloride in 75 ml of deionized distilled water in a 100 ml glass volumetric flask. Add 10 ml of concentrated HNO_3, and adjust the volume to exactly 100 ml with deionized distilled water. Mix thoroughly. This solution is stable for at least 1 month.

6.2.3 *Sulfuric Acid, 5 Percent (V/V)*. Dilute 25 ml of concentrated H_2SO_4 to 500 ml with deionized distilled water.

6.2.4 *Intermediate Mercury Standard Solution, 10 μg Hg/ml*. Prepare fresh weekly. Pipet 5.0 ml of the mercury stock solution (6.2.2) into a 500-ml glass volumetric flask and add 20 ml of the 5 percent H_2SO_4 solution. Dilute to exactly 500 ml with deionized distilled water. Thoroughly mix the solution.

6.2.5 *Working Mercury Standard Solution, 200 ng Hg/ml*. Prepare fresh daily. Pipet 5.0 ml from the "Intermediate Mercury Standard Solution" (6.2.4) into a 250-ml volumetric glass flask. Add 10 ml of the 5 percent H_2SO_4 and 2 ml of the 0.1 M ICl absorbing solution taken as a blank (7.2.3) and dilute to 250 ml with deionized distilled water. Mix thoroughly.

7. *Procedure*—7.1 *Sampling*. Because of the complexity of this method, testers should be trained and experienced with the test procedures to assure reliable results. Since the amount of Hg that is collected generally is small, the method must be carefully applied to prevent contamination or loss of sample.

7.1.1 *Pretest Preparation*. Follow the general procedure given in Method 5, Section 4.1.1, except omit the directions on the filter.

7.1.2 *Preliminary Determinations*. Follow the general procedure given in Method 5, Section 4.1.2, except as follows: Select a nozzle size based on the range of velocity heads to assure that it is not necessary to change the nozzle size in order to maintain isokinetic sampling rates below 28 liters/min (1.0 cfm).

Obtain samples over a period or periods that accurately determine the maximum emissions that occur in a 24-hour period. In the case of cyclic operations, run sufficient tests for the accurate determination of the emissions that occur over the duration of the cycle. A minimum sample time of 2 hours is recommended. In some instances, high Hg or high SO_2 concentrations make it impossible to sample for the desired minimum time. This is indicated by reddening (liberation of free iodine) in the first impinger. In these cases, the tester may divide the sample run into two or more subruns to insure that the absorbing solution is not depleted.

7.1.3 *Preparation of Sampling Train*. Clean all glassware [probe, impingers, and connectors] by rinsing with 50 percent HNO_3, tap water, 0.1 M ICl, tap water, and finally deionized distilled water. Place 100 ml of 0.1 M ICl in each of the first three impingers. Take care to prevent the absorbing solution from contacting any greased surfaces. Place approximately 200 g of preweighed silica gel in the fourth impinger. The tester may use more silica gel, but should be careful to ensure that it is not entrained and carried out from the impinger during sampling. Place the silica gel container in a clean place for later use in the sample recovery. Alternatively, determine and record the weight of the silica gel plus impinger to the nearest 0.5 g.

Install the selected nozzle using a Viton A O-ring when stack temperatures are less than 260° C (500° F). Use a fiberglass string gasket if temperatures are higher. See APTD-0576 (Citation 9 in Section 10) for details. Other connecting systems using either 316 stainless steel or Teflon ferrules may be used. Mark the probe with heat-resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point. Assemble the train as shown in Figure 101-1, using (if necessary) a very light coat of silicone grease on all ground glass joints. Grease only the outer portion (see APTD-0576) to avoid possibility of contamination by the silicone grease.

Note.—An empty impinger may be inserted between the third impinger and the silica gel to remove excess moisture from the sample stream.

After the sampling train has been assembled, turn on and set the probe, if applicable, at the desired operating temperature. Allow time for the temperatures to stabilize. Place crushed ice around the impingers.

7.1.4 *Leak-Check Procedures.* Follow the leak-check procedures outlined in Method 5, Sections 4.1.4.1 (Pretest Leak Check), 4.1.4.2 (Leak Checks During Sample Run), and 4.1.4.3 (Post-Test Leak Check).

7.1.5 *Mercury Train Operation.* Follow the general procedure given in Method 5, Section 4.1.5. For each run, record the data required on a data sheet such as the one shown in Figure 101-4.

7.1.6 *Calculation of Percent Isokinetic.* Same as Method 5, Section 4.1.6.

7.2 *Sample Recovery.* Begin proper cleanup procedure as soon as the probe is removed from the stack at the end of the sampling period.

Allow the probe to cool. When it can be safely handled, wipe off any external particulate matter near the tip of the probe nozzle and place a cap over it. Do not cap off the probe tip tightly while the sampling train is cooling. Capping would create a vacuum and draw liquid out from the impingers.

Before moving the sampling train to the cleanup site, remove the probe from the train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the impinger. Use either ground-glass stoppers, plastic caps, or serum caps to close these openings.

Transfer the probe and impinger assembly to a cleanup area that is clean, protected from the wind, and free of Hg contamination. The ambient air in laboratories located in the immediate vicinity of Hg-using facilities is not normally free of Hg contamination.

Inspect the train before and during assembly, and note any abnormal conditions. Treat the sample as follows:

7.2.1 *Container No. 1* (Impinger and Probe). Using a graduated cylinder, measure the liquid in the first three impingers to within ±1 ml. Record the volume of liquid present (e.g., see Figure 5-3 of Method 5). This information is needed to calculate the moisture content of the effluent gas. (Use only glass storage bottles and graduated cylinders that have been precleaned as in Section 7.1.3.) Place the contents of the first three impingers into a 1000-ml glass sample bottle.

Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover the Hg (and any condensate) from the probe nozzle, probe fitting, and probe liner as follows: Rinse these components with two 50-ml portions of 0.1 M IC1. Next, rinse the probe nozzle, fitting and liner, and each piece of connecting glassware between the probe liner and the back half of the third impinger with a maximum of 400 ml of deionized distilled water. Add all washings to the 1000-ml glass sample bottle containing the liquid from the first three impingers.

After all washings have been collected in the sample container, tighten the lid on the container to prevent leakage during shipment to the laboratory. Mark the height of the liquid to determine later whether leakage occurred during transport. Label the container to clearly identify its contents.

7.2.2 *Container No. 2* (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal. The tester may use as aids a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. The small amount of particles that may adhere to the impinger wall need not be removed. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g; record this weight.

7.2.3 *Container No. 3* (Absorbing Solution Blank). For a blank, place 50 ml of the 0.1 M IC1 absorbing solution in a 100-ml sample bottle. Seal the container. Use this blank to prepare the working mercury standard solution (6.2.5).

7.3 *Sample Preparation.* Check the liquid level in each container to see whether liquid was lost during transport. If a noticeable amount of leakage occurred, either void the sample or use methods subject to the approval of the Administrator to account for the losses. Then follow the procedures below:

7.3.1 *Container No. 1* (Impinger and Probe). Carefully transfer the contents of Container No. 1 into a 1000-ml volumetric flask and adjust the volume to exactly 1000 ml with deionized distilled water.

7.3.2 *Dilutions.* Pipet a 2-ml aliquot from the diluted sample from 7.3.1 into a 250-ml volumetric flask. Add 10 ml of 5 percent H_2SO_4 and adjust the volume to exactly 250 ml with deionized distilled water. These solutions are stable for at least 72 hours.

Note.—The dilution factor will be 250/2 for this solution.

7.4 *Analysis.* Calibrate the spectrophotometer and recorder and prepare the calibration curve as described in Sections 8.1 to 8.4.

7.4.1 *Mercury Samples.* Repeat the procedure used to establish the calibration curve with appropriately sized aliquots (1 to 5 ml) of each of the diluted samples (from Section 7.3.2) until two consecutive peak heights agree within ±3 percent of their average value. The peak maximum of an aliquot (except the 5-ml aliquot) must be greater than 10 percent of the recorder full scale. If the peak maximum of a 1.0-ml aliquot is off scale on the recorder, further dilute the original source sample to bring the Hg concentration into the calibration range of the spectrophotometer.

Run a blank and standard at least after every five samples to check the spectrophotometer calibration; recalibrate as necessary.

It is also recommended that at least one sample from each stack test be checked by the method of standard additions to confirm that matrix effects have not interfered in the analysis.

7.4.2 *Container No. 2* (Silica Gel). Weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g using a balance. (This step may be conducted in the field.)

8. *Calibration and Standards*—Before use, clean all glassware, both new and used, as follows: brush with soap and water, liberally rinse with tap water, soak for 1 hour in 50 percent HNO_3, and then rinse with deionized distilled water.

8.1 *Flow Calibration.* Assemble the aeration system as shown in Figure 101-5. Set the outlet pressure on the aeration gas cylinder regulator to a minimum pressure of 500 mm Hg (10 psi), and use the flowmetering valve and a bubble flowmeter or wet test meter to obtain a flow rate of 1.5±0.1 liters/min through the aeration cell. After the flow calibration is complete, remove the bubble flowmeter from the system.

8.2 *Optical Cell Heating System Calibration.* Using a 50-ml graduated cylinder, add 50 ml of deionized distilled water to the bottle section of the aeration cell and attach the bottle section to the bubbler section of the cell. Attach the aeration cell to the optical cell; and while aerating at 1.5 liters/min, determine the minimum variable transformer setting necessary to prevent condensation of moisture in the optical cell and in the connecting tubing. (This setting should not exceed 20 volts.)

8.3 *Spectrophotometer and Recorder Calibration.* The mercury response may be measured by either peak height or peak area.

Note.—The temperature of the solution affects the rate at which elemental Hg is released from a solution and, consequently, it affects the shape of the absorption curve (area) and the point of maximum absorbance (peak height). Therefore, to obtain reproducible results, bring all solutions to room temperature before use.

Set the spectrophotometer wavelength at 253.7 nm, and make certain the optical cell is at the minimum temperature that will prevent water condensation. Then set the recorder scale as follows: Using a 50-ml graduated cylinder, add 50 ml of deionized distilled water to the aeration cell bottle and pipet 5.0 ml of the working mercury standard solution into the aeration cell.

Note.—Always add the Hg-containing solution to the aeration cell after the 50 ml of deionized distilled water.

Place a Teflon-coated stirring bar in the bottle. Before attaching the bottle section to the bubbler section of the aeration cell, make certain that (1) the aeration cell exit arm stopcock (Figure 101–3) is closed (so that Hg will not prematurely enter the optical cell when the reducing agent is being added) and (2) there is no flow through the bubbler. If conditions (1) and (2) are met, attach the bottle section to the bubbler section of the aeration cell through the side arm of the cell and immediately stopper the side arm. Stir the solution for 15 sec, turn on the recorder, open the aeration cell exit arm stopcock, and then immediately initiate aeration with continued stirring. Determine the maximum absorbance of the standard and set this value to read 90 percent of the recorder full scale.

8.4 *Calibration Curve.* After setting the recorder scale, repeat the procedure in Section 8.3 using 0.0-, 1.0-, 2.0-, 3.0-, 4.0-, and 5.0-ml aliquots of the working standard solution (final amount of Hg in the aeration cell is 0, 200, 400, 600, 800, and 1000 ng, respectively). Repeat this procedure on each aliquot size until two consecutive peaks agree within 3 percent of their average value. (Note: To prevent Hg carryover from one sample to another, do not close the aeration gas tank valve and do not disconnect the aeration cell from the optical cell until the recorder pen has returned to the baseline.) It should not be necessary to disconnect the aeration gas inlet line from the aeration cell when changing samples. After separating the bottle and bubbler sections of the aeration cell, place the bubbler section into a 600-ml beaker containing approximately 400 ml of deionized distilled water. Rinse the bottle section of the aeration cell with a stream of deionized distilled water to remove all traces of the tin (II) reducing agent. Also, to prevent the loss of Hg before aeration, remove all traces of the reducing agent between samples by washing with deionized distilled water. It will be necessary, however, to wash the aeration cell parts with concentrated HCl if any of the following conditions occur: (1) A white film appears on any inside surface of the aeration cell, (2) the calibration curve changes suddenly, or (3) the replicate samples do not yield reproducible results.

Subtract the average peak height (or peak area) of the blank (0.0-ml aliquot)—which should be less than 2 percent of recorder full scale—from the averaged peak heights of the 1.0-, 2.0-, 3.0-, 4.0-, and 5.0-ml aliquot standards. If the blank absorbance is greater than 2 percent of full-scale, the probable cause is Hg contamination of a reagent or carry-over of Hg from a previous sample. Plot the corrected peak height of each standard solution versus the corresponding final total Hg weight in the aeration cell (in ng) and draw the best-fit straight line. This line should either pass through the origin or pass through a point no further from the origin than ±2 percent of the recorder full scale. If the line does not pass through or very near to the origin, check for nonlinearity of the curve and for incorrectly prepared standards.

8.5 *Sampling Train Calibration.* Calibrate the sampling train components according to the procedures outlined in the following sections of Method 5: Section 5.1 (Probe Nozzle), Section 5.2 (Pitot Tube), Section 5.3 (Metering System), Section 5.4 (Probe Heater), Section 5.5 (Temperature Gauges), Section 5.7 (Barometer). Note that the leak-check described in Section 5.6 of Method 5 applies to this method.

9. *Calculations*—9.1 *Dry Gas Volume.* Using the data from this test, calculate $V_{m(std)}$, the dry gas sample volume at standard conditions (corrected for leakage, if necessary) as outlined in Section 6.3 of Method 5.

9.2 *Volume of Water Vapor and Moisture Content.* Using the data obtained from this test, calculate the volume of water vapor $V_{w(std)}$ and the moisture content B_{ws} of the stack gas. Use Equations 5–2 and 5–3 of Method 5.

9.3 *Stack Gas Velocity.* Using the data from this test and Equation 2–9 of Method 2, calculate the average stack gas velocity v_s.

9.4 *Total Mercury.* For each source sample, correct the average maximum absorbance of the two consecutive samples whose peak heights agree within ±3 percent of their average for the contribution of the solution blank (see Section 8.4). Use the calibration curve and these corrected averages, to determine the final total weight of mercury in nanograms in the aeration cell for each source sample. Correct for any dilutions made to bring the sample in the working range of the spectrophotometer. Then calculate the Hg in µg (m_{Hg}) in the original solution as follows:

$$m_{Hg} = \frac{C_{Hg(AC)}(D.F.)\,V_f\,10^{-3}}{S} \qquad \text{Eq. 101–1}$$

Where:

$C_{Hg(AC)}$ = Total nanograms of mercury in aliquot analyzed (reagent blank subtracted).

D.F. = Dilution factor for the Hg-containing solution (before adding to the aeration cell; e.g., D.F. = 250/2 if the source samples were diluted as described in Section 7.3.2.)

V_f = Solution volume of original sample, 1000 ml for samples diluted as described in Section 7.2.1.

10^{-3} = Conversion factor, µg/ng.

S = Aliquot volume added to aeration cell, ml.

9.5 *Mercury Emission Rate.* Calculate the Hg emission rate R in g/day for continuous operations using Equation 101–2. For cyclic operations, use only the time per day each stack is in operation. The total Hg emission rate from a source will be the summation of results from all stacks.

$$R = K\,\frac{m_{Hg}\,v_s\,A_s\,(86{,}400\times10^{-6})}{[V_{m(std)}+V_{w(std)}](T_s/P_s)} \qquad \text{Eq. 101–2}$$

Where:

A_s = Stack cross-sectional area, m² (ft²).

86,400 = Conversion factor, sec/day.

10^{-6} = Conversion factor, g/µg.

T_s = Absolute average stack gas temperature, °K (°R).

P_s = Absolute stack gas pressure, mm Hg (in. Hg).

K = 0.3858 °K/mm Hg for metric units.
= 17.65 °R/in. Hg for English units.

9.6 *Isokinetic Variation and Acceptable Results.* Same as Method 5, Sections 6.11 and 6.12, respectively.

9.7 *Determination of Compliance.* Each performance test consists of three repetitions of the applicable test method. For the purpose of determining compliance with an applicable national emission standard, use the average of the results of all repetitions.

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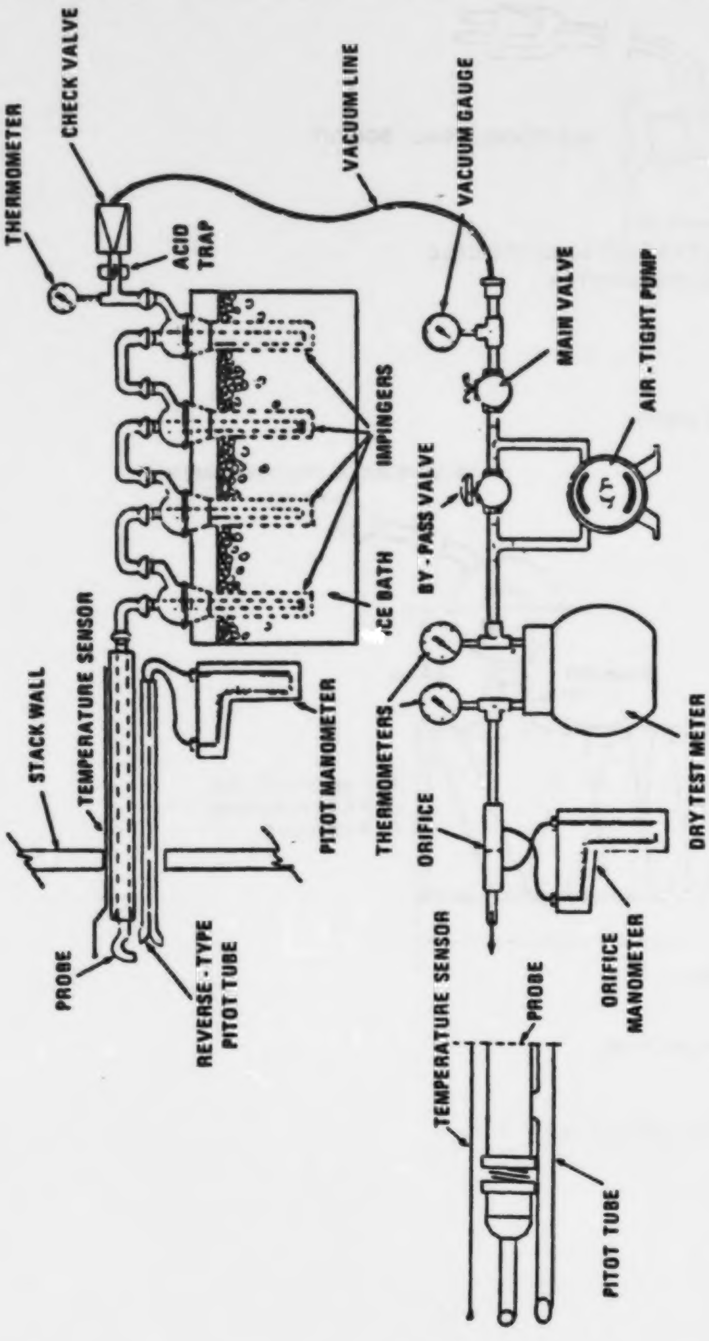
THERMOMETER
CHECK VALVE
ACID TRAP
VACUUM LINE
VACUUM GAUGE
MAIN VALVE
AIR-TIGHT PUMP
IMPINGERS
BY-PASS VALVE
ICE BATH
STACK WALL
TEMPERATURE SENSOR
PITOT MANOMETER
THERMOMETERS
DRY TEST METER
ORIFICE
ORIFICE MANOMETER
PROBE
REVERSE-TYPE PITOT TUBE
TEMPERATURE SENSOR
PROBE
PITOT TUBE

Figure 101-1 Mercury sampling train.

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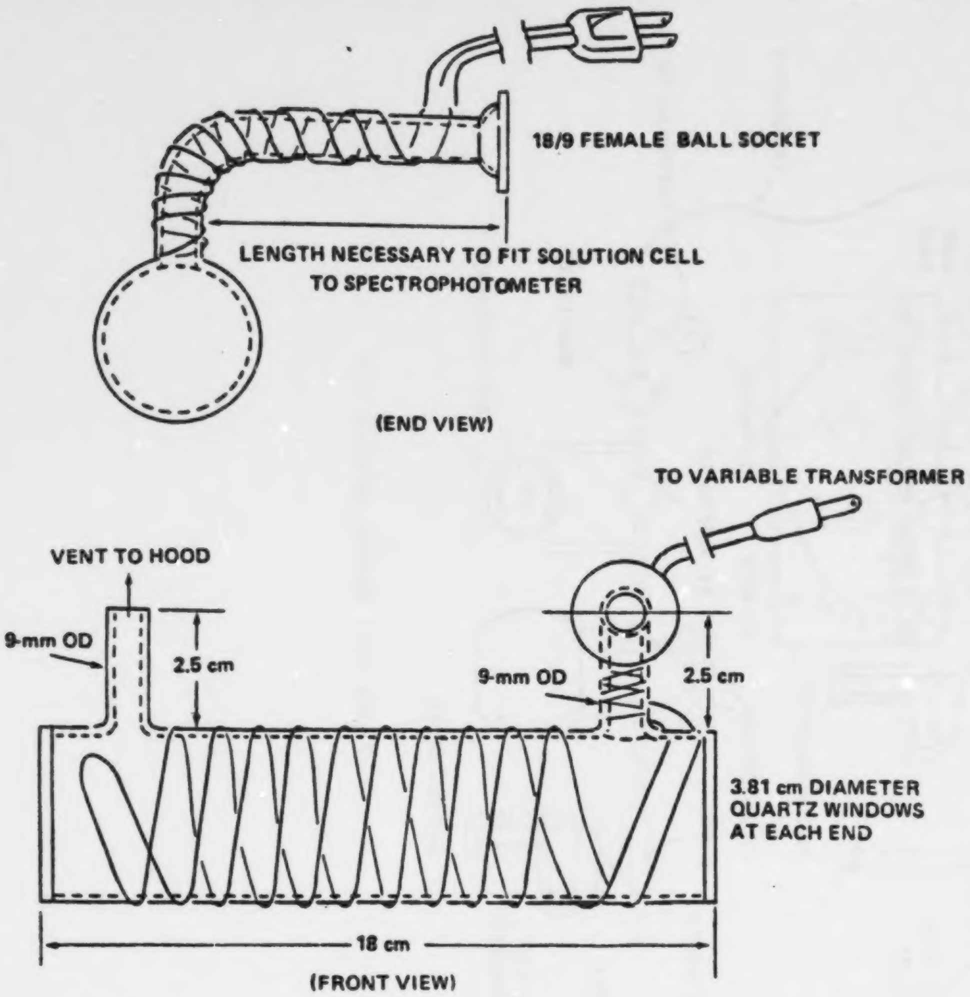
18/9 FEMALE BALL SOCKET
LENGTH NECESSARY TO FIT SOLUTION CELL TO SPECTROPHOTOMETER
(END VIEW)
TO VARIABLE TRANSFORMER
VENT TO HOOD
9-mm OD
2.5 cm
9-mm OD
2.5 cm
3.81 cm DIAMETER QUARTZ WINDOWS AT EACH END
18 cm
(FRONT VIEW)

NOTES:
CELL WOUND WITH 24-GAUGE NICHROME WIRE
TOLERANCES ± 5 PERCENT

Figure 101-2. Optical cell.

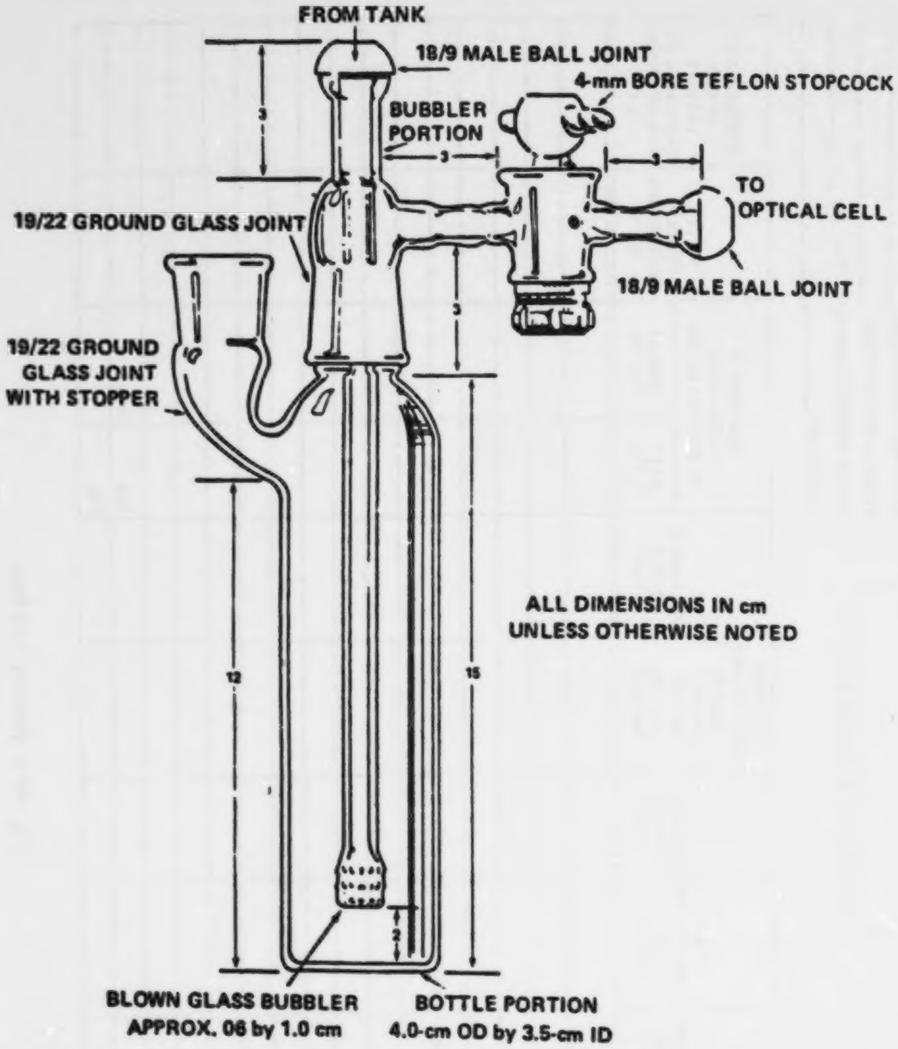
FROM TANK
18/9 MALE BALL JOINT
4-mm BORE TEFLON STOPCOCK
BUBBLER PORTION
3
3
3
TO OPTICAL CELL
19/22 GROUND GLASS JOINT
18/9 MALE BALL JOINT
3
19/22 GROUND GLASS JOINT WITH STOPPER
ALL DIMENSIONS IN cm UNLESS OTHERWISE NOTED
12
15
2
BLOWN GLASS BUBBLER APPROX. 06 by 1.0 cm
BOTTLE PORTION 4.0-cm OD by 3.5-cm ID

Figure 101-3. Aeration cell.

PLANT __________
LOCATION __________
OPERATOR __________
DATE __________
RUN NO. __________
SAMPLE BOX NO. __________
FILTER BOX NO. __________
METER $\Delta H@$ __________
C FACTOR __________
PITOT TUBE COEFFICIENT, C_p __________

SCHEMATIC OF STACK CROSS SECTION

AMBIENT TEMPERATURE __________
BAROMETRIC PRESSURE __________
ASSUMED MOISTURE, % __________
PROBE LENGTH, m (ft) __________
NOZZLE IDENTIFICATION NO. __________
AVERAGE CALIBRATED NOZZLE DIAMETER, cm (in.) __________
PROBE HEATER SETTING* __________
LEAK RATE, m^3/min (cfm) __________
PROBE LINER MATERIAL __________
STATIC PRESSURE, mm Hg (in. Hg) __________
FILTER NO.* __________

TRAVERSE POINT NUMBER	SAMPLING TIME (θ), min.	VACUUM mm Hg (in. Hg)	STACK TEMPERATURE (T_S) °C (°F)	VELOCITY HEAD (ΔP_S)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER mm H_2O (in. H_2O)	GAS SAMPLE VOLUME m^3 (ft^3)	GAS SAMPLE TEMPERATURE AT DRY GAS METER		FILTER HOLDER* TEMPERATURE, °C (°F)	TEMPERATURE OF GAS LEAVING CONDENSER OR LAST IMPINGER, °C (°F)
							INLET °C (°F)	OUTLET °C (°F)		
TOTAL							Avg.	Avg.		
AVERAGE							Avg.			

*IF APPLICABLE

Fig. 101-4. Mercury field data.

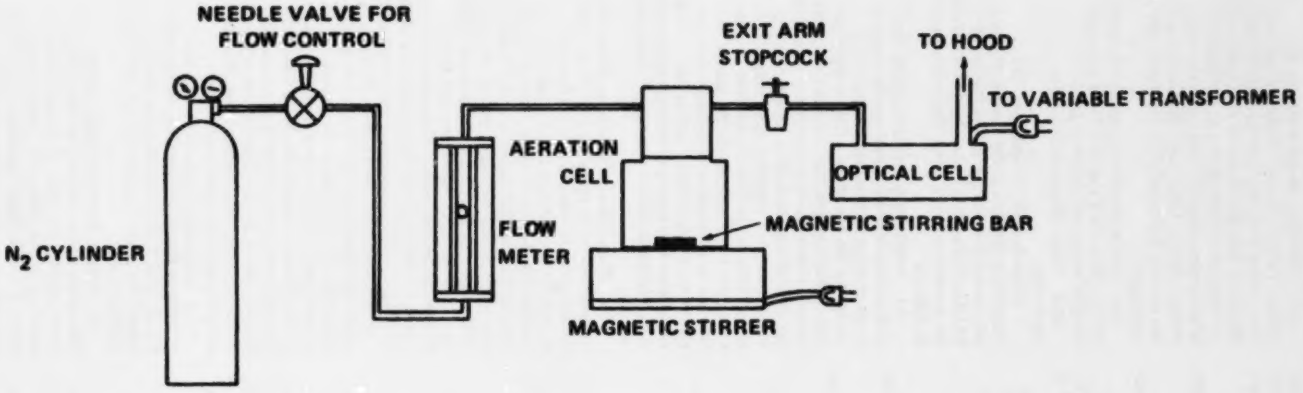
NEEDLE VALVE FOR FLOW CONTROL
EXIT ARM STOPCOCK
TO HOOD
TO VARIABLE TRANSFORMER
AERATION CELL
OPTICAL CELL
MAGNETIC STIRRING BAR
FLOW METER
N_2 CYLINDER
MAGNETIC STIRRER

Figure 101-5. Schematic of aeration system.

BILLING CODE 6560-50-C

Method 101A. Determination of Particulate and Gaseous Mercury Emissions From Sewage Sludge Incinerators

Introduction

This method is similar to Method 101, except acidic potassium permangante solution is used instead of acidic iodine monochloride for collection.

1. *Applicability and Principle*—1.1 *Applicability.* This method applies to the determination of particulate and gaseous mercury (Hg) emissions from sewage sludge incinerators and other sources as specified in the regulations.

1.2 *Principle.* Particulate and gaseous Hg emissions are withdrawn isokinetically from the source and collected in acidic potassium permanganate ($KMn0_4$) solution. The Hg collected (in the mercuric form) is reduced to elemental Hg, which is then aerated from the solution into an optical cell and measured by atomic absorption spectrophotometry.

2. *Range and Sensitivity*—2.1 *Range.* After initial dilution, the range of this method is 20 to 800 ng Hg/ml. The upper limit can be extended by further dilution of the sample.

2.2 *Sensitivity.* The sensitivity of the method depends on the recorder/spectrophotometer combination selected.

3. *Interfering Agents*—3.1 *Sampling.* Excessive oxidizable organic matter in the stack gas prematurely depletes the $KMn0_4$ solution and thereby prevents further collection of Hg.

3.2 *Analysis.* Condensation of water vapor on the optical cell windows causes a positive interference.

4. *Precision*—Based on eight paired-train tests, the within-laboratory standard deviation was estimated to be 4.8 μg Hg/ml in the concentration range of 50 to 130 μg Hg/m³.

5. *Apparatus*—5.1 *Sampling Train and Sample Recovery.* Same as Method 101, Sections 5.1 and 5.2, respectively, except for the following variations:

5.1.1 *Probe Liner.* Same as Method 101, Section 5.1.2, except that if a filter is used ahead of the impingers, the tester must use the probe heating system to minimize the condensation of gaseous Hg.

5.1.2 *Filter Holder (Optional).* Borosilicate glass with a rigid stainless-steel wire-screen filter support (do not use glass frit supports) and a silicone rubber of Teflon gasket, designed to provide a positive seal against leakage from outside or around the filter. The filter holder must be equipped with a filter heating system capable of maintaining a temperature around the filter holder of 120 ± 15° C (246 ± 25° F) during sampling to minimize both water and gaseous Hg condensation. The tester may use a filter in cases where the stream contains large quantities of particulate matter.

5.2 *Analysis.* The apparatus needed for analysis is the same as Method 101, Sections 5.3 and 5.4, except as follows:

5.2.1 *Volumetric Pipets.* Class A; 1–, 2–, 3–, 4–, 5–, 10–, and 20-ml.

5.2.2 *Graduated Cylinder.* 25–ml.

5.2.3 *Steam Bath.*

6. *Reagents—Use ACS reagent-grade chemicals or equivalent, unless otherwise specified.*

6.1 *Sampling and Recovery.* The reagents used in sampling and recovery are as follows:

6.1.1 *Water.* Deionized distilled, meeting ASTM Specifications for Type I Reagent Water—ASTM Test Method D 1193–74. If high concentrations of organic matter are not expected to be present, the analyst may eliminate the $KMn0_4$ test for oxidizable organic matter. Use this water in all dilutions and solution preparations.

6.1.2 *Nitric Acid (HNO_3), 50 Percent (V/V).* Mix equal volumes of concentrated HNO_3 and deionized distilled water, being careful to slowly add the acid to the water.

6.1.3 *Silica Gel.* Indicating type, 6- to 16-mesh. If previously used, dry at 175° C (350° F) for 2 hr. The tester may use new silica gel as received.

6.1.4 *Filter (Optional).* Glass fiber filter, without organic binder, exhibiting at least 99.95 percent efficiency on 0.3 μm dioctyl phthalate smoke particles. The tester may use the filter in cases where the gas stream contains large quantities of particulate matter, but he should analyze blank filters for Hg content.

6.1.5 *Sulfuric Acid (H_2SO_4), 10 Percent (V/V).* Add and mix 100 ml of concentrated H_2SO_4 with 900 ml of deionized distilled water.

6.1.6 *Absorbing Solution, 4 Percent $KMnO_4$ (W/V).* Prepare fresh daily. Dissolve 40 g of $KMnO_4$ in sufficient 10 percent H_2SO_4 to make 1 liter. Prepare and store in glass bottles to prevent degradation.

6.2 *Analysis.* The reagents needed for analysis are listed below:

6.2.1 *Tin (III) Solution.* Prepare fresh daily and keep sealed when not being used. Competely dissolve 20 g of tin (II) chloride [or 25 g of tin (II) sulfate] crystals (Baker Analyzed reagent grade or any other brand that will give a clear solution) in 25 ml of concentrated HCl. Dilute to 250 ml with deionized distilled water. Do not substitute HNO_3, H_2SO_4, or other strong acids for the HCl.

6.2.2 *Sodium Chloride—Hydroxylamine Solution.* Dissolve 12 g of sodium chloride and 12 g of hydroxylamine sulfate (or 12 g of hydroxylamine hydrochloride) in deionized distilled water and dilute to 100 ml.

6.2.3 *Hydrochloric Acid (HCl), 8 N.* Dilute 67 ml of concentrated HNO_3 to 100 ml with deionzed distilled water (slowly add the HCl to the water).

6.2.4 *Nitric Acid, 15 Percent (V/V).* Dilute 15 ml of concentrated HNO_3 to 100 ml with deionized distilled water.

6.2.5 *Mercury Stock Solution, 1 mg Hg/ml.* Prepare and store all mercury standard solutions in borosilicate glass containers. Completely dissolve 0.1354 g of mercury (II) chloride in 75 ml of deionized distilled water. Add 100 ml of concentrated HNO_3, and adjust the volume to exactly 100 ml with deionized distilled water. Mix thoroughly. This solution is stable for at least 1 month.

6.2.6 *Intermediate Mercury Standard Solution, 10 μg Hg/ml.* Prepare fresh weekly. Pipet 5.0 ml of the mercury stock solution (Section 6.2.5) into a 500-ml volumetric flask and add 20 ml of 15 percent HNO_3 solution. Adjust the volume to exactly 500 ml with deionized distilled water. Thoroughly mix the solution.

6.2.7 *Working Mercury Standard Solution, 200 ng Hg/ml.* Prepare fresh daily. Pipet 5.0 ml from the "Intermediate Mercury Standard Solution" (Section 6.2.6) into a 250-ml volumetric flask. Add 5 ml of 4 percent $KMnO_4$ absorbing solution and 5 ml of 15 percent HNO_3. Adjust the volume to exactly 250 ml with deionized distilled water. Mix thoroughly.

6.2.8 *Potassium Permanganate, 5 Percent (W/V).* Dissolve 5 g of $KMnO_4$ in deionized distilled water and dilute to 100 ml.

6.2.9 *Filter.* Whatman No. 40 or equivalent.

7. *Procedure*—7.1 *Sampling.* The sampling procedure is the same as Method 101, except for changes due to the use of $KMnO_4$ instead of ICl absorbing solution and the possible use of a filter. These changes are as follows:

7.1.1 *Preliminary Determinations.* The preliminary determinations are the same as those given in Method 101, Section 7.1.2, except for the absorbing solution depletion sign. In this method, high oxidizable organic content may make it impossible to sample for the desired minimum time. This problem is indicated by the complete bleaching of the purple color of the $KMnO_4$ solution. In these cases, the tester may divide the sample run into two or more subruns to insure that the absorbing solution would not be depleted. In cases where an excess of water condensation is encountered, collect two runs to make one sample.

7.1.2 *Preparation of Sampling Train.* The preparation of the sampling train is the same as that given in Method 101, Section 7.1.3, except for the cleaning of the glassware [probe, filter holder (if used), impingers, and connectors] and the charging of the first three impingers. In this method, clean all the glass components by rinsing with 50 percent HNO_3, tap water, 8 N HCl, tap water, and finally deionized distilled water. Then place 50 ml of 4 percent $KMnO_4$ in the first impinger and 100 ml in each of the second and third impingers.

If a filter is used, use a pair of tweezers to place the filter in the filter holder. Be sure to center the filter and place the gasket in proper position to prevent the sample gas stream from by-passing the filter. Check the filter for tears after assembly is completed. Be sure also to set the filter heating system at the desired operating temperature after the sampling train has been assembled.

7.1.3 *Sampling Train Operation.* In addition to the procedure given in Method 101, Section 7.1.5, maintain a temperature around the filter (if applicable) of 120°±14° C (248°±25° F).

7.2 *Sample Recovery.* Begin proper cleanup procedure as soon as the probe is removed from the stack at the end of the sampling period. Allow the probe to cool. When it can be safely handled, wipe off any external particulate matter near the tip of the probe nozzle and place a cap over it. Do not cap off the probe tip tightly while the sampling train is cooling because the resultant vacuum would draw liquid out from the impingers.

Before moving the sample train to the cleanup site, remove the probe from the train, wipe off the silicone grease, and cap the open outlet of the probe. Be careful not to lose any condensate that might be present. Wipe off the silicone grease from the impinger. Use either ground-glass stoppers, plastic caps, or serum caps to close these openings.

Transfer the probe, impinger assembly, and (if applicable) filter assembly to a cleanup area that is clean, protected from the wind, and free of Hg contamination. The ambient air in laboratories located in the immediate vicinity of Hg-using facilities is not normally free of Hg contamination.

Inspect the train before and during assembly, and note any abnormal conditions. Treat the sample as follows:

7.2.1 *Container No. 1* (Impinger, Probe, and Filter Holder). Use a graduated cylinder; measure the liquid in the first three impingers to within ±1 ml. Record the volume of liquid present (e.g., see Figure 5–3 of Method 5 in Part 60 of 40 CFR). This information is needed to calculate the moisture content of the effluent gas. (Use only graduated cylinder and glass storage bottles that have been precleaned as in Section 7.1.2.) Place the contents of the first three impingers into a 1000-ml glass sample bottle.

(**Note.**—If a filter is used, remove the filter from its holder, as outlined under "Container No. 3" below.)

Taking care that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover the Hg (and any condensate) from the probe nozzle, probe fitting, probe liner and front half of the filter holder (if applicable) as follows: Rinse these components with a total of 250 to 400 ml of fresh 4 percent $KMnO_4$ solution; add all washings to the 1000-ml glass sample bottle; remove any residual brown deposits on the glassware using the minimum amount of 8 N HCl required; and add this HCl rinse to this sample container.

After all washings have been collected in the sample container, tighten the lid on the container to prevent leakage during shipment to the laboratory. Mark the height of the fluid level to determine whether leakage occurs during transport. Label the container to clearly identify its contents.

7.2.2. *Container No. 2* (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal. The tester may use as aids a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. It is not necessary to remove the small amount of particles that may adhere to the impinger wall and are difficult to remove. Since the gain in weight is to be used for moisture calculations, do not use any water or other liquids to transfer the silica gel. If a balance is available in the field, weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g; record this weight.

7.2.3 *Container No. 3* (Filter). If a filter was used, carefully remove it from the filter holder, place it in a 100-ml glass sample bottle, and add 20 to 40 ml of 4 percent $KMnO_4$. If it is necessary to fold the filter, be sure that the particulate cake is inside the fold. Carefully transfer to the 150-ml sample bottle any particulate matter and filter fibers that adhere to the filter holder gasket by using a dry Nylon bristle brush and a sharp-edged blade. Seal the container. Label the container to clearly identify its contents. Mark the height of the fluid level to determine whether leakage occurs during transport.

7.2.4 *Container No. 4* (Filter Blank). If a filter was used, treat an unused filter from the same filter lot used for sampling in the same manner as Container No. 3.

7.2.5 *Container No. 5* (Absorbing Solution Blank). For a blank, place 500 ml of 4 percent $KMnO_4$ absorbing solution in a 1000-ml sample bottle. Seal the container.

7.3 *Sample Preparation.* Check liquid level in each container to see if liquid was lost during transport. If a noticeable amount of leakage occurred, either void the sample or use methods subject to the approval of the Administrator to account for the losses. Then follow the procedures below.

7.3.1 *Containers No. 3 and No. 4* (Filter and Filter Blank). If a filter was used, place the contents, including the filter, of Containers No. 3 and No. 4 in separate 250-ml beakers and heat the beakers on a steam bath until most of the liquid has evaporated. Do not take to dryness. Add 20 ml of concentrated HNO_3 to the beakers, cover them with a glass, and heat on a hot plate at 70° C for 2 hours. Remove from the hot plate and filter the solution through Whatman No. 40 filter paper. Save the filtrate for Hg analysis. Discard the filter.

7.3.2 *Container No. 1* (Impingers, Probe, and Filter Holder). Filter the contents of Container No. 1 through Whatman 40 filter paper to remove the brown MnO_2 precipitate. Wash the filter with 50 ml of 4 percent $KMnO_4$ absorbing solution and add this wash to the filtrate. Discard the filter. Combine the filtrates from Containers No. 1 and No. 3 (if applicable), and dilute to a known volume with deionized distilled water. Mix thoroughly.

7.3.3 *Container No. 5* (Absorbing Solution Blank). Treat this container as described in Section 7.3.2. Combine this filtrate with the filtrate with Container No. 4 and dilute to a known volume with deionized distilled water. Mix thoroughly.

7.4 *Analysis.* Calibrate the spectrophotometer and recorder and prepare the calibration curve as described in Sections 8.1 to 8.4. Then repeat the procedure used to establish the calibration curve with appropriately sized aliquots (1 to 10 ml) of the samples (from Sections 7.3.2 and 7.3.3) until two consecutive peak heights agree within ±3 percent of their average value. If the 10-ml sample is below the detectable limit, use a larger aliquot (up to 20 ml), but decrease the volume of water added to the aeration cell accordingly to prevent the solution volume from exceeding the capacity of the aeration bottle. If the peak maximum of a 1.0-ml aliquot is off scale, further dilute the original sample to bring the Hg concentration into the calibration range of the spectrophotometer. If the Hg content of the absorbing solution and filter blank is below the working range of the analytical method, use zero for the blank.

Run a blank and standard at least after every five samples to check the spectrophotometer calibration; recalibrate as necessary.

It is also recommended that at least one sample from each stack test be checked by the Method of Standard Additions to confirm that matrix effects have not interfered in the analysis.

8. *Calibration and Standards*—The calibration and standards are the same as Method 101, Section 8, except for the following variations:

8.1 *Optical Cell Heating System Calibration.* Same as method 101, Section 8.2, except use a 25-ml graduated cylinder to add 25 ml of deionized distilled water to the bottle section of the aeration cell.

8.2 *Spectrophotometer and Recorder Calibration.* The mercury response may be measured by either peak height or peak area. (Note: the temperature of the solution affects the rate at which elemental Hg is released from a solution and, consequently, it affects the shape of the absorption curve (area) and the point of maximum absorbance (peak height). To obtain reproducible results, all solutions must be brought to room temperature before use.) Set the spectrophotometer wave length at 253.7 nm and make certain the optical cell is at the minimum temperature that will prevent water condensation.

Then set the recorder scale as follows: Using a 25-ml graduated cylinder, add 25 ml of deionized distilled water to the aeration cell bottle and pipet 5.0 ml of the working mercury standard solution into the aeration cell. (Note: Always add the Hg-containing solution to the aeration cell after the 25 ml of deionized distilled water.) Place a Teflon-coated stirring bar in the bottle. Add 5 ml of the 4 percent $KMnO_4$ absorbing solution followed by 5 ml of 15 percent HNO_3 and 5 ml of 5 percent $KMnO_4$ to the aeration bottle and mix well. Now, attach the bottle section to the bubbler section of the aeration cell and make certain that (1) the aeration cell exit arm stopcock (Figure 101–3 of Method 101) is closed (so that Hg will not prematurely enter the optical cell when the reducing agent is being added) and (2) there is no flow through the bubbler. Add 5 ml of sodium chloride hydroxylamine in 1-ml increments until the solution is colorless. Now add 5 ml of tin (II) solution to the aeration bottle through the side arm. Stir the solution for 15 seconds, turn on the recorder, open the aeration cell exit arm stopcock, and immediately initiate aeration with continued stirring. Determine the maximum absorbance of the standard and set this value to read 90 percent of the recorder full scale.

9. *Calculations*—9.1 *Dry Gas Volume, Volume of Water Vapor and Moisture Content, Stack Gas Velocity, Isokinetic Variation and Acceptable Results, and Determination of Compliance.* Same as Method 101, Sections 9.1, 9.2, 9.3, 9.6, and 9.7, respectively, except use data obtained from this test.

9.2 *Total Mercury.* For each source sample, correct the average maximum absorbance of the two consecutive samples whose peak heights agreed within ±3 percent of their average for the contribution of the field blank. Then calculate the total Hg content in μg in each sample. Correct for any dilutions made to bring the sample into the working range of the spectrophotometer.

9.3 *Mercury Emission Rate.* Calculate the Hg emission rate R in g/day for continuous operations using Equation 101A–1. For cyclic operations, use only the time per day each stack is in operation. The total Hg emission rate from a source will be the summation of results from all stacks.

$$R = \frac{K\, m_{Hg}\, v_s\, A_s\, (86{,}400 \times 10^{-6})}{[V_m(std) + V_{w(std)}]\, (T_s/P_s)} \qquad \text{Eq. 101A–1}$$

Where:

m_{Hg} = Total Hg content in each sample, μg.
v_s = Average stack gas velocity, m/sec (fps).
A_s = Stack cross-sectional area, m^2 (ft^2).
86,400 = Conversion factor, sec/day.
10^{-6} = Conversion factor, g/μg.
$V_{m(std)}$ = Dry gas sample volume at standard conditions, corrected for leakage (if any), m^3 (ft^3).
$V_{w(std)}$ = Volume of water vapor at standard conditions, m^3 (ft^3).
T_s = Absolute average stack gas temperature, °K (°R).
P_s = Absolute stack gas pressure, mm Hg (in. Hg).
K = 0.3858 °K/mm Hg for metric units.
= 17.64 °R/in. Hg for English units.

10. *Bibliography.* 1. Same as Method 101, Section 10.

2. Mitchell, W. J., M. R. Midgett, J. C. Suggs, and D. Albrinck.

Test Methods to Determine the Mercury Emissions from Sludge Incineration Plants. U.S. Environmental Protection Agency. Research Triangle Park, North Carolina. Publication No. EPA-600/4-79-058. September 1979.

Method 102. Determination of Particulate and Gaseous Mercury Emissions From Chlor-Alkali Plants—Hydrogen Streams

1. *Introduction*—Although similar to Method 101, Method 102 requires changes to accommodate the sample being extracted from a hydrogen stream. Conduct the test according to Method 101, except as shown below:

2. *Mercury Train Operation*—2.1 *Probe Heating System.* Do not use, unless otherwise specified.

2.2 *Glass Fiber Filter.* Do not use, unless otherwise specified.

2.3 *Safety Procedures.* The sampler must conduct the source test under conditions of utmost safety, because hydrogen and air mixtures are explosive. Since the sampling train essentially is leakless, attention to safe operation can be concentrated at the inlet and outlet. If a leak does occur, however, remove the meter box cover to avoid a possible explosive mixture. The following specific precautions are recommended:

2.3.1 *Operate only the vacuum pump during the test.* The other electrical equipment, e.g., heaters, fans, and timers, normally are not essential to the success of a hydrogen stream test.

2.3.2 *Seal the sample port to minimize leakage of hydrogen from the stack.*

2.3.3 *Vent sampled hydrogen at least 3 m (10 feet) away from the train.* This can be accomplished by attaching a 13-mm-ID (0.50-in) Tygon tube to the exhaust from the orifice meter. (Note: A smaller ID tubing may cause the orifice meter calibration to be erroneous.) Take care to ensure that the exhaust line is not bent or pinched.

2.4 *Setting of Isokinetic Rates.*

2.4.1 If a nomograph is used, take special care in the calculation of the molecular weight of the stack gas and in the setting of the nomograph to maintain isokinetic conditions during sampling (Sections 2.4.1.1 through 2.4.1.3 below).

2.4.1.1 *Calibrate the meter box orifice.* Use the techniques described in APTD–0576 (see Citation 9 in Section 10 of Method 101). Calibration of the orifice meter at flow conditions that simulate the conditions at the source is suggested. Calibration should either be done with hydrogen or with some other gas having a similar Reynolds Number so that there is similarity between the Reynolds Numbers during calibration and during sampling.

2.4.1.2 The nomograph described in APTD–0576 cannot be used to calculate the C factor because the nomograph is designed for use when the stack gas dry molecular weight is 20±4. Instead, the following calculation should be made to determine the proper C factor:

$$C = 0.00154\, \Delta H_{@}\, C_p^2\, T_m (P_s/P_m) \frac{(1-B_{ws})^2}{(1-B_{ws}) + 18\, B_{ws}/M_d}$$

Where:

$\Delta H_{@}$ = Meter box calibration factor obtained in Section 2.4.1.1, in. H_2O.
C_p = Pitot tube calibration coefficient, dimensionless.
T_m = Absolute temperature of gas at the orifice, °R.
P_s = Absolute pressure of stack gas, in Hg.
P_m = Absolute pressure of gas at the meter, in Hg.
B_{ws} = Fraction by volume of water vapor in the stack gas.
M_d = Dry molecular weight of stack gas, 1b/1b-mole.

Note. This calculation is left in English units, and is not converted to metric units because nomographs are based on English units.

2.4.1.3 Set the calculated C factor on the operating nomograph and select the proper nozzle diameter and K factor as specified in APTD–0576. If the C factor obtained in Section 2.4.1.2 exceeds the values specified on the existing operating nomograph, expand the C scale logarithmically so that the values can be properly located.

2.4.2 If a calculator is used to set isokinetic rates, it is suggested that the isokinetic equation presented in Citation 17 in the Bibliography of Method 101 be used.

2.5 Sampling in Small (<12-in.-Diameter) Stacks. When the stack diameter (or equivalent diameter) is less than 12 inches, conventional pitot tube-probe assemblies should not be used. For sampling guidelines, see Citation 18 in the Bibliography of Method 101.

* * * * *

[FR Doc. 82-15373 Filed 6-7-82; 8:45 am]

67

40 CFR Parts 60 and 61

[A-9-FRL 2165-6]

Delegation of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS); State of Arizona

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of delegation.

SUMMARY: The EPA hereby places the public on notice of its delegation of new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) authority to the Pima County Health Department (PCHD). This action is necessary to bring the NSPS and NESHAPS program delegations up to date with recent EPA promulgations and amendments of NSPS and NESHAPS categories. This action does not create any new regulatory requirements affecting the public. The effect of the delegation is to shift primary program responsibility for the affected NSPS and NESHAPS source categories from EPA to local governments.

EFFECTIVE DATE: June 3, 1982.

FOR FURTHER INFORMATION CONTACT: David Jesson, New Source Section (A-3-1), Air Operations Branch, Air Management Division, EPA, Region 9, 215 Fremont Street, San Francisco, CA 94105, Tel: (415) 974-8220, FTS 454-8220.

SUPPLEMENTARY INFORMATION: The PCHD has required authority for delegation of certain NSPS and NESHAPS source categories. A delegation of authority was granted by letter dated May 24, 1982 and is reproduced in its entirety as follows:

Mr. C. Lee Fox,
Director, Air Quality Control District, Pima County Health Department, 151 West Congress Street, Tucson, AZ 85701.

Dear Mr. Fox: I am pleased to inform you that we are delegating to your agency authority to implement and enforce certain categories of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS). We have reviewed your request for delegation and have found your present programs, rules, and procedures to be acceptable. This delegation includes authority for the following source categories:

NSPS	40 CFR Part 60 subpart
Electric Utility Steam Generators	Da.
Storage Vessels for Petroleum Liquids	Ka.
Kraft Pulp Mills	BB.
Grain Elevators	DD.
Stationary Gas Turbines	GG.
Lime Manufacturing Plants	HH.

NESHAPS	40 CFR Part 61 subpart
Vinyl Chloride	F.

In addition, we are redelegating the following NSPS and NESHAPS categories since your revised programs, rules, and procedures are acceptable:

NSPS	40 CFR Part 60 subpart
Fossil-Fuel Fired Steam Generators	D.
Incinerators	E.
Portland Cement Plants	F.
Nitric Acid Plants	G.
Sulfuric Acid Plants	H.
Asphalt Concrete Plants	I.
Petroleum Refineries	J.
Storage Vessels for Petroleum Liquids	K.
Secondary Lead Smelters	L.
Secondary Brass and Bronze Ingot Production Plants.	M.
Iron and Steel Plants (BOPF)	N.
Sewage Treatment Plants	O.
Primary Copper Smelters	P.
Primary Zinc Smelters	Q.
Primary Lead Smelters	R.
Primary Aluminum Reduction Plants	S.
Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants.	T.
Phosphate Fertilizer Industry: Superphosphoric Acid Plants.	U.
Phosphate Fertilizer Industry: Diammonium Phosphate Plants.	V.
Phosphate Fertilizer Industry: Triple Superphosphate Plants.	W.
Phosphate Fertilizer Industry: Granular Triple Superphosphate.	X.
Coal Preparation Plants	Y.
Ferroalloy Production Facilities	Z.
Iron and Steel Plants (Electric Arc Furnaces)	AA.

NESHAPS	40 CFR Part 61 subpart
Asbestos	B.
Beryllium	C.
Mercury	E.

Acceptance of this delegation constitutes your agreement to follow all applicable provisions of 40 CFR Parts 60 and 61. The delegation is effective upon the date of this letter unless the USEPA receives written notice from you of any objections within 10 days of receipt of this letter. A notice of this delegated authority will be published in the **Federal Register** in the near future.

Cordially yours,

Sonia F. Crow,
Regional Administrator.

cc. Arizona Department of Health Services.

With respect to areas under the jurisdiction of the PCHD, all reports, applications, submittals, and other communications pertaining to the above listed NSPS and NESHAPS source categories should be directed to the PCHD at the address shown in the letter of delegation.

The Office of Management and Budget has exempted this rule from the requirements of Section 3 of Executive Order 12291.

(Secs. 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 1857, *et seq.*))

Dated: June 29, 1982.

Sonia F. Crow,

Regional Administrator.

[FR Doc. 82-18881 Filed 7-9-82; 8:45 am]

BILLING CODE 6560-50-M

68

40 CFR Parts 60 and 61

[A-9-FRL 2165-7]

Delegation of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS); State of California

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of delegation.

SUMMARY: The EPA hereby places the public on notice of its delegation of new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) authority to the California Air Resources Board (CARB) on behalf of the Ventura County Air Pollution Control District (APCD). This action is necessary to bring the NSPS and NESHAPS program delegations up to date with recent EPA promulgations and amendments of NSPS and NESHAPS categories. This action does not create any new regulatory requirements affecting the public. The effect of the delegation is to shift primary program responsibility for the affected NSPS and NESHAPS source categories from EPA to local governments.

EFFECTIVE DATE: June 3, 1982.

FOR FURTHER INFORMATION CONTACT: David Jesson, New Source Section (A-3-1), Air Operations Branch, Air Management Division, EPA, Region 9, 215 Fremont Street, San Francisco, CA 94105, Tel: (415) 974-8220, FTS 454-8220.

SUPPLEMENTARY INFORMATION: The CARB has requested authority for delegation of certain NSPS and NESHAPS source categories on behalf of the Ventura County APCD. A delegation of authority was granted by letter dated May 24, 1982 and is reproduced in its entirety as follows:

Mr. James D. Boyd,
Executive Officer, Air Resources Board,
1709-11th Street, P.O. Box 2815,
Sacramento, CA 95812.

Dear Mr. Boyd: I am pleased to inform you that we are delegating to your agency authority to implement and enforce certain categories of New Source Performance Standards (NSPS) on behalf of the Ventura County Air Pollution Control District (APCD). We have reviewed your request for delegation and have found that the Ventura County APCD's present programs, rules, and procedures are acceptable. This delegation includes authority for the following source categories:

NSPS	40 CFR Part 60 subpart
General Provisions	A.

In addition, we are redelegating the following National Emission Standards for Hazardous Air Pollutants (NESHAPS) categories since the Ventura County APCD's revised programs, rules, and procedures are acceptable.

NESHAPS	40 CFR Part 61 subpart
Asbestos	B.
Beryllium	C.
Beryllium Rocket Motor Firing	D.
Mercury	E.

Acceptance of this delegation constitutes your agreement to follow all applicable provisions of 40 CFR Parts 60 and 61. The delegation is effective upon the date of this letter unless the USEPA receives written notice from you or the District of any objections within 10 days of receipt of this letter. A notice of this delegated authority will be published in the **Federal Register** in the future.

Cordially yours,

Sonia F. Crow,

Regional Administrator.

cc: Ventura County Air Pollution Control District

With respect to Ventura County, all reports, applications, submittals, and other communications pertaining to the above listed NSPS and NESHAPS source categories should be directed to the Ventura County APCD at the address shown in 40 CFR Parts 60.4 and 61.4.

The Office of Management and Budget has exempted this rule from the requirements of Section 3 of Executive Order 12291.

(Secs. 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 1857, *et seq.*))

Dated: June 29, 1982.

Sonia F. Crow,

Regional Administrator.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subpart A of Parts 60 and 61 Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

Subpart A—General Provisions

§§ 60.4 and 61.04 [Amended]

1. Sections 60.4(b)(F) and 61.04(b)(F) are each amended by revising the address of the Ventura County Air Pollution Control District to read as follows:

* * * * *

(b) * * *

(F) * * *

Ventura County Air Pollution Control District,
800 South Victoria Avenue,
Ventura, CA 93009

* * * * *

[FR Doc. 82-18882 Filed 7-9-82; 8:45 am]

BILLING CODE 6560-50-M

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40 CFR Parts 60 and 61

[A-9-FRL 2165-8]

Delegation of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS), State of California

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of delegation.

SUMMARY: The EPA hereby places the public on notice of its delegation of new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) authority to the California Air Resources Board (CARB) on behalf of the South Coast Air Quality Management District (AQMD). This action is necessary to bring the NSPS and NESHAPS program delegations up to date with recent EPA promulgations and amendments of NSPS and NESHAPS categories. This action does not create any new regulatory requirements affecting the public. The effect of the delegation is to shift primary program responsibility for the affected NSPS and NESHAPS source categories from EPA to local governments.

EFFECTIVE DATE: June 3, 1982.

FOR FURTHER INFORMATION CONTACT: David Jesson, New Source Section (A-3-1), Air Operations Branch, Air Management Division, EPA, Region 9, 215 Fremont Street, San Francisco, CA 94105, Tel: (415) 974-8220, FTS 454-8220.

SUPPLEMENTARY INFORMATION: The CARB has requested authority for delegation of certain NSPA and NESHAPS source categories on behalf of the South Coast AQMD. A delegation of authority was granted by letter dated May 24, 1982 and is reproduced in its entirety as follows:

Mr. James D. Boyd,
Executive Officer,
Air Resources Board,
1709—11th Street,
P.O. Box 2815,
Sacramento, CA 95812.

Dear Mr. Boyd: I am pleased to inform you that we are delegating to your agency authority to implement and enforce certain categories of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS) on behalf of the South Coast Air Quality Management District (AQMD). We have reviewed your request for delegation and have found that the South Coast AQMD's present programs, rules, and procedures are acceptable. This delegation includes authority for the following source categories:

NSPS	40 CFR Part 60 subpart
General Provisions	A.
Storage Vessels for Petroleum Liquids	Ka.
Stationary Gas Turbines	GG.
Lime Manufacturing Plants	HH.
Ammonium Sulfate	PP.

NESHAPS	40 CFR Part 61 subpart
General Provisions	A.

In addition, we are redelegating the following NSPS and NESHAPS categories since the South Coast AQMD's revised programs, rules, and procedures are acceptable:

NSPS	40 CFR Part 60 subpart
Fossil-Fuel Fired Steam Generators	D.
Incinerators	E.
Portland Cement Plants	F.
Nitric Acid Plants	G.
Sulfuric Acid Plants	H.
Asphalt Concrete Plants	I.
Petroleum Refineries	J.
Storage Vessels for Petroleum Liquids	K.
Secondary Lead Smelters	L.
Secondary Brass & Bronze Ingot Production Plants.	M.
Iron and Steel Plants (BOPF)	N.
Sewage Treatment Plants	O.
Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants.	T.
Phosphate Fertilizer Industry: Superphosphoric Acid Plants.	U
Phosphate Fertilizer Industry: Diammonium Phosphate Plants.	V.
Phosphate Fertilizer Industry: Triple Superphosphate Plants.	W.
Phosphate Fertilizer Industry: Granular Triple Superphosphate.	X.
Coal Preparation Plants	Y.
Iron and Steel Plants (Electric Arc Furnaces)	AA.
Grain Elevators	DD.

NESHAPS	40 CFR Part 61 subpart
Asbestos	B.
Beryllium	C.
Beryllium Rocket	
Motor Firing	D.
Mercury	E.
Vinyl Chloride	F.

Acceptance of this delegation constitutes your agreement to follow all applicable provisions of 40 CFR Parts 60 and 61. The delegation is effective upon the date of this letter unless the USEPA receives written notice from you or the District of any objections within 10 days of receipt of this letter. A notice of this delegated authority will be published in the **Federal Register** in the near future.

Cordially yours,

Sonia F. Crow,
Regional Administrator.

cc: South Coast Air Quality Management District

With respect to areas under the jurisdiction of the South Coast AQMD, all reports, applications, submittals, and other communications pertaining to the above listed NSPS and NESHAPS source categories should be directed to the South Coast AQMD at the address shown in 40 CFR Parts 60.4 and 61.4.

The Office of Management and Budget has exempted this rule from the requirements of Section 3 of Executive Order 12291.

(Sec. 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 1857, *et seq.*))

Dated: June 29, 1982.

Sonia F. Crow,
Regional Administrator.

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

PART 61—NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Subpart A of Parts 60 and 61 of Chapter I, Title 40 of the Code of Federal Regulations is amended as follows:

Subpart A—General Provisions

§§ 60.4 and 61.04 [Amended]

1. Sections 60.4(b)(F) and 61.04(b)(F) are each amended by revising the address of the South Coast Air Quality Management District to read as follows:

* * * * *

(b) * * *

(F) * * *

South Coast Air Quality Management District, 9150 Flair Drive, El Monte, CA 91731

* * * * *

[FR Doc. 82-18883 Filed 7-9-82; 8:45 am]

BILLING CODE 6560-50-M

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40 CFR Parts 60 and 61

[A-9-FRL 2166-1]

Delegation of New Source Performance Standards (NSPS); and National Emission Standards for Hazardous Air Pollutants (NESHAPS); State of California

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of delegation.

SUMMARY: The EPA hereby places the public on notice of its delegation of New Source Performance Standards (NSPS) and National Emission Standards for the Hazardous Air Pollutants (NESHAPS) authority to the California Air Resources Board (CARB) on behalf of the Bay Area Air Quality Management District (AQMD). This action is necessary to bring the NSPS and NESHAPS program delegations up to date with recent EPA promulgations and amendments of NSPS and NESHAPS categories. This action does not create any new regulatory requirements affecting the public. The effect of the delegation is to shift primary program responsibility for the affected NSPS and NESHAPS source categories from EPA to local governments.

EFFECTIVE DATE: June 3, 1982.

FOR FURTHER INFORMATION CONTACT: David Jesson, New Source Section (A-3-1), Air Operations Branch, Air Management Division, EPA, Region 9, 215 Fremont Street, San Francisco, CA 94105, Tel: (415) 974-8220, FTS 454-8220.

SUPPLEMENTARY INFORMATION: The CARB has requested authority for delegation of certain NSPS and NESHAPS source categories on behalf of the Bay Area AQMD. A delegation of authority was granted by letter dated May 24, 1982 and is reproduced in its entirety as follows:

Mr. James D. Boyd,

Executive Officer, Air Resources Board, 1709 11th Street, P.O. Box 2815, Sacramento, CA 95812.

Dear Mr. Boyd: I am pleased to inform you that we are delegating to your agency authority to implement and enforce certain categories of New Source Performance Standards (NSPS) on behalf of the Bay Area Air Quality Management District (AQMD). We have reviewed your request for delegation and have found that the Bay Area AQMD's present programs, rules, and procedures are acceptable. This delegation includes authority for the following source categories:

NSPS	40 CFR Part 60 subpart
Electric Utility Steam Generators	Da.
Kraft Pulp Mills	BB.
Grain Elevators	DD.
Stationary Gas Turbines	GG.
Lime Manufacturing Plants	HH.
Ammonium Sulfate	PP.

In addition, we are redelegating the following NSPS and National Emission Standards for Hazardous Air Pollutants (NESHAPS) categories since the Bay Area AQMD's revised programs, rules, and procedures are acceptable.

NSPS	40 CFR Part 60 subpart
General Provisions	A.
Fossil-Fuel Fired Steam Generators	D.
Incinerators	E.
Portland Cement Plants	F.
Nitric Acid Plants	G.
Sulfuric Acid Plants	H.
Asphalt Concrete Plants	I.
Petroleum Refineries	J.
Storage Vessels for Petroleum Liquids	K.
Secondary Lead Smelters	L.
Secondary Brass & Bronze Ingot Production Plants.	M.
Iron and Steel Plants (BOPF)	N.
Sewage Treatment Plants	O.
Primary Copper Smelters	P.
Primary Zinc Smelters	Q.
Primary Lead Smelters	R.
Primary Aluminum Reduction Plants	S.
Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants.	T.
Phosphate Fertilizer Industry: Superphosphoric Acid Plants.	U.
Phosphate Fertilizer Industry: Diammonium Phosphate Plants.	V.
Phosphate Fertilizer Industry: Triple Superphosphate Plants.	W.
Phosphate Fertilizer Industry: Granular Triple Superphosphate.	X.
Coal Preparation Plants	Y.
Ferroalloy Production Facilities	Z.
Iron and Steel Plants (Electric Arc Furnaces)	AA.

NESHAPS	40 CFR Part 61 subpart
General Provisions	A.
Asbestos	B.
Beryllium	C.
Beryllium Rocket Motor Firing	D.
Mercury	E.

Acceptance of this delegation constitutes your agreement to follow all applicable provisions of 40 CFR Parts 60 and 61. The delegation is effective upon the date of this letter unless the USEPA receives written notice from you or the District of any objections within 10 days of receipt of this letter. A notice of this delegated authority will be published in the **Federal Register** in the near future.

Cordially yours,

Sonia F. Crow, Regional Administrator.

cc: Bay Area Air Quality Management District

With respect to areas under the jurisdiction of the Bay Area AQMD, all reports, applications, submittals, and other communications pertaining to the above listed NSPS and NESHAPS source categories should be directed to the Bay Area AQMD at the address shown in 40 CFR Parts 60.4 and 61.4.

The Office of Management and Budget has exempted this rule from the requirements of Section 3 of Executive Order 12291.

(Secs. 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 1857, *et seq.*))

Dated: June 29, 1982.

Sonia F. Crow,

Regional Administrator.

[FR Doc. 82-18884 Filed 7-9-82; 8:45 am]

BILLING CODE 6560-50-M

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40 CFR Parts 60 and 61

[A-9-FRL 2166-2]

Delegation of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS); State of California

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of delegation.

SUMMARY: The EPA hereby places the public on notice of its delegation of new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) authority to the California Air Resources Board (CARB) on behalf of the San Diego County Air Pollution Control District (APCD). This action is necessary to bring the NSPS and NESHAPS program delegations up to date with recent EPA promulgations and amendments of NSPS and NESHAPS categories. This action does not create any new regulatory requirements affecting the public. The effect of the delegation is to shift primary program responsibility for the affected NSPS and NESHAPS source categories from EPA to local governments.

EFFECTIVE DATE: June 3, 1982.

FOR FURTHER INFORMATION CONTACT: David Jesson, New Source Section (A-3-1), Air Operations Branch, Air Management Division, EPA, Region 9, 215 Fremont Street, San Francisco, CA 94105, Tel: (415) 974-8220, FTS 454-8220.

SUPPLEMENTARY INFORMATION: The CARB has requested authority for delegation of certain NSPS and NESHAPS source categories on behalf of the San Diego County APCD. A delegation of authority was granted by letter dated May 24, 1982 and is reproduced in its entirety as follows:

Mr. James D. Boyd,

Executive Officer, Air Resources Board, 1709 11th Street, P.O. Box 2815, Sacramento, CA 95812.

Dear Mr. Boyd: I am pleased to inform you that we are delegating to your agency authority to implement and enforce certain categories of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS) on behalf of the San Diego County Air Pollution Control District (APCD). We have reviewed your request for delegation and have found that the San Diego County APCD's present programs, rules, and procedures are acceptable. This delegation includes authority for the following source categories:

NSPS	40 CFR Part 60 subpart
General Provisions	A.
Electric Utility Steam Generators	Da.
Storage Vessels for Petroleum Liquids	Ka.
Glass Manufacturing Plants	CC.
Grain Elevators	DD.
Stationary Gas Turbines	GG.

NESHAPS	40 CFR Part 61 subpart
General Provisions	A.

In addition, we are redelegating the following NSPS categories since the San Diego County APCD's revised programs, rules, and procedures are acceptable:

NSPS	40 CFR Part 60 subpart
Petroleum Refineries	J.
Storage Vessels for Petroleum Liquids	K.

Acceptance of this delegation constitutes your agreement to follow all applicable provisions of 40 CFR Parts 60 and 61. The delegation is effective upon the date of this letter unless the USEPA receives written notice from you or the District of any objections within 10 days of receipt of this letter. A notice of this delegated authority will be published in the **Federal Register** in the near future.

Cordially yours,

Sonia F. Crow,

Regional Administrator.

cc: San Diego County Air Pollution Control District

With respect to San Diego County, all reports, applications, submittals, and other communications pertaining to the above listed NSPS and NESHAPS source categories should be directed to the San Diego County APCD at the address shown in 40 CFR Parts 60.4 and 61.4.

The Office of Management and Budget has exempted this rule from the requirements of Section 3 of Executive Order 12291.

(Secs. 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 1857, *et seq.*))

Dated: June 29, 1982.

Sonia F. Crow,

Regional Administrator.

[FR Doc. 82-18865 Filed 7-9-82; 8:45 am]

BILLING CODE 6560-50-M

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40 CFR Parts 60 and 61

[A-9-FRL 2165-4]

Delegation of New Source Performance Standards (NSPA) and National Emission Standards for Hazardous Air Pollutants (NESHAPS); State of Nevada

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of delegation.

SUMMARY: The EPA hereby places the public on notice of its delegation of new source performance standards (NSPS) and national emission standards for hazardous air pollutants (NESHAPS) authority to the Clark County Health District (CCHD). This action is necessary to bring the NSPS and NESHAPS program delegations up to date with recent EPA promulgations and amendments of NSPS and NESHAPS categories. This action does not create any new regulatory requirements affecting the public. The effect of the delegation is to shift primary program responsibility for the affected NSPS and NESHAPS source categories from EPA to State and local governments.

EFFECTIVE DATE: June 3, 1982.

FOR FURTHER INFORMATION CONTACT: David Jesson; New Source Section (A-3-1), Air Operations Branch, Air Management Division, EPA, Region 9, 215 Fremont Street, San Francisco, CA 94105, Tel: (415) 974-8220, FTS 454-8220.

SUPPLEMENTARY INFORMATION: The CCHD has requested authority for delegation of certain NSPS and NESHAPS source categories. A delegation of authority was granted by letter dated May 24, 1982 and is reproduced in its entirety as follows:

Mr. Michael H. Naylor, *P.E.,*
Director, Air Pollution Control Division, Clark County Health District, P.O. Box 4426, 625 Shadow Lane, Las Vegas, NV 89106.

Dear Mr. Naylor: I am pleased to inform you that we are delegating to your agency authority to implement and enforce certain categories of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS). We have reviewed your request for delegation and have found your present programs and procedures to be acceptable. This delegation includes authority for the following source categories:

NSPS	40 CFR Part 60 subpart
General Provisions	A.
Storage Vessels for Petroleum Liquids	Ka
Grain Elevators	DD
Stationary Gas Turbines	GG
Lime Manufacturing Plants	HH
Automobile and Light Duty Truck Surface Coating Operations.	MM

NESHAPS	40 CFR Part 61 subpart
General Provisions	A.
Beryllium Rocket Motor Firing	D.

In addition, we are redelegating the following NSPS and NFSHAPS categories since your revised programs and procedures are acceptable:

NSPS	40 CFR Part 60 subpart
Fossil-Fuel Fired Steam Generators	D.
Incinerators	E.
Portland Cement Plants	F.
Asphalt Concrete Plants	I.
Storage Vessels for Petroleum Liquids	K.
Secondary Lead Smelters	L.
Sewage Treatment Plants	O
Primary Copper Smelters	P.
Primary Zinc Smelters	Q
Primary Lead Smelters	R
Coal Preparation Plants	Y.

NESHAPS	40 CFR Part 61 subpart
Asbestos	B.
Beryllium	C.
Mercury	E.
Vinyl Chloride	F.

Acceptance of this delegation constitutes your agreement to follow all applicable provisions of 40 CFR Parts 60 and 61. The delegation is effective upon the date of this letter unless the USEPA receives written notice from you of any objections within 10 days of receipt of this letter. A notice of this delegated authority will be published in the **Federal Register** in the near future.

Cordially yours,

Sonia F. Crow,

Regional Administrator.

cc: Division of Environmental Protection, Nevada Department of Conservation and Natural Resources

With respect to areas under the jurisdiction of the CCHD, all reports, applications, submittals, and other communications pertaining to the above listed NSPS and NESHAPS source categories should be directed to the CCHD at the address shown in the letter of delegation.

The Office of Management and Budget has exempted this rule from the requirements of Section 3 of Executive Order 12291.

(Secs. 111 and 112 of the Clean Air Act, as amended (42 U.S.C. 1857, *et seq.*)

Dated: June 29, 1982.

Sonia F. Crow,

Regional Administrator.

[FR Doc. 82-18880 Filed 7-9-82; 8:45 am]

SECTION V

PROPOSED AMENDMENTS

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V. PROPOSED AMENDMENTS

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ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

ASBESTOS

SUBPART B

V-B-1

[40 CFR Part 61]

[FRL 788-2]

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Development of Asbestos Standard for the Production and Use of Crushed Stone

AGENCY: Environmental Protection Agency.

ACTION: Advance notice of proposed rulemaking.

SUMARY: The Environmental Protection Agency (EPA) is undertaking a study of the crushed stone industry to determine the extent to which quarrying operations are being conducted in areas containing serpentinite rock deposits, to determine the asbestos content of the rock being mined, and to determine whether the public is being exposed to asbestos from various uses of the rock. Serpentinite rock from a quarry location in Rockville, Maryland, has been found to contain significant quantities of asbestos, and the use of unbound (without a coating or binding agent) crushed stone produced from this rock on crushed stone roads has been shown to result in high concentrations of asbestos in the air near these roads. If EPA determines that the production and use of asbestos-containing serpentinite rock is causing asbestos emissions proximate to the public in a number of locations, standards will be proposed in the FEDERAL REGISTER under Section 12 of the Clean Air Act.

DATE: The information requested in this notice must be submitted on or before January 10, 1977.

ADDRESSEE: Information in response to this Advance Notice of Proposed Rulemaking should be submitted to the Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, Attention: Mr. Ron R. Goodwin.

FOR FURTHER INFORMATION CONTACT:

Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, 919-541-5271.

SUPPLEMENTARY INFORMATION: It is well documented that airborne asbestos fibers are related to human disease, specifically pulmonary fibrosis, carcinoma, and pleural mesothelioma. The quantification of the health risk associated with specific airborne concentrations, fiber dimensions, and chemical composition of the fibers, however, is inexact. The problem of estimating the magnitude of this risk to human health is further complicated by the 20- to 40-year latency period between the onset of exposure and the appearance of disease. In addition, cancer-causing agents appear to be "non-threshold" pollutants so that no level can be set which is entirely safe from cancer risk. Consequently, EPA believes that exposure to airborne asbestos should be reduced to the greatest extent feasible. A hazardous emission standard currently exists for several sources of asbestos. See 40 CFR, Part 61, Subpart B.

In early 1977, EPA tests indicated that dust from the crushed stone produced by a Rockville, Maryland, rock quarry contained from 0.25 to 0.70 weight percent chrysotile asbestos. Analyses of air samples taken by EPA and Mt. Sinai School of Medicine near several sites in Montgomery County, Maryland, where unbound crushed stone from this quarry was in use, revealed ambient air concentrations of chrysotile asbestos as high as 17 million fibers per cubic meter and as high as 6400 nanograms per cubic meter, depending on distance from the road and prevailing traffic conditions. These concentrations are as much as 1000 times higher than those usually found in urban and metropolitan areas.

It is clear from the air monitoring data that several uses of unbound cruched stone from the Rockville, Maryland, quarry can cause elevated concentrations of asbestos in the air. The Maryland State Bureau of Air Quality and Noise Control, the Montgomery County Department of Environmental Protection, and the Montgomery County Department of Transportation are taking measures to control asbestos emissions from roads and other public areas which were surfaced with crushed stone from the Rockville quarry. Warning signs have been posted in parks and schoolyards where asbestos-containing crushed stone is in use and in many cases the rock has been removed. Dust suppressants and liquid asphalt has been applied to the roads where the most severe dust problems existed. The Montgomery County Department of Transportation has issued a moratorium on the use of crushed stone from the Rockville quarry and has notified all public users of the rock and the largest private users that the crushed stone they have used is from the Rockville quarry and may contain asbestos. Maryland has also found that the rock in several other quarries in the State contains asbestos and, as a result, is developing regulations to restrict the future use of crushed stone containing asbestos in certain applications and to control emissions from certain areas which have been surfaced with asbestos-containing crushed stone in an unbound form.

An analysis of geological survey maps prepared by the United States Geological Survey indicates that the Rockville, Maryland, rock quarry and a number of other rock quarries in the United States, produce crushed stone from serpentinite rock deposits. Geologists agree that most serpentinite rock deposits contain at least a small percentage of chrysotile asbestos. This leads EPA to believe that a number of crushed stone plants in the United States may be producing asbestos-containing crushed stone similar to that produced by the Rockville, Maryland, rock quarry. Other types of rock deposits may also contain asbestos; however, the correlation between other rock types and the presence of asbestos is not as clear.

EPA is therefore beginning a study to determine the extent of the problem of asbestos emissions that may exist from the use of crushed stone produced from serpentinite rock. This study is being conducted in response to requests from officials of Montgomery County, Maryland; two Congressmen from the State of Maryland; and the Environmental Defense Fund. The purpose of this study is to determine whether EPA should develop a Federal standard to limit asbestos emissions from this source. In this study, EPA will identify serpentinite rock quarries within the United States, collect and analyze rock samples from these quarries, determine whether elevated levels of asbestos in the air are occurring due to the use of crushed stone containing various asbestos contents, and determine how widespread the problem appears to be.

Currently both the State and local agencies have indicated their intention to take appropriate measures to control this problem in Maryland. If EPA's study determines that this problem does not warrant work on proposal of a Federal standard, EPA assistance will be available to local agencies on a case-by-case basis to deal with this problem.

EPA is requesting that all interested persons submit factual information concerning crushed stone produced from serpentinite rock, particularly information on its production, sale, and use in various applications; its asbestos content; and public exposure to ambient air asbestos emissions resulting from its use in various applications. It is expected that such information will assist EPA in determining whether to formulate any regulations.

Dated: November 3, 1977.

DOUGLAS M. COSTLE,
Administrator.

[FR Doc.77-32666 Filed 11-9-77;8:45 am]

ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

VINYL CHLORIDE

SUBPART F

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 61]

[FRL 728-5]

VINYL CHLORIDE

National Emission Standards for Hazardous Air Pollutants

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The proposed amendments are being made to the vinyl chloride standard which has promulgated October 21, 1976, and would apply to new and existing ethylene dichloride, vinyl chloride, and polyvinyl chloride plants. The standard and the proposed amendments implement the Clean Air Act and are based on the Administrator's determination that vinyl chloride is a hazardous air pollutant. The intended effect of the proposed amendments is to require improved effectiveness of control technology at existing plants, impose more stringent emission limits on new sources, and prohibit an emission increase within the vicinity of an existing source due to the construction of a new source.

DATES: Comments must be received on or before August 1, 1977.

ADDRESSES: Comments should be submitted (preferably in triplicate) to the Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina, Attention: Mr. Don R. Goodwin.

All public comments received may be inspected and copied at the Public Information Reference Unit (EPA Library), Room 2922, 401 M Street, SW., Washington, D.C.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, North Carolina 27711, Telephone No. 919-688-8146, ext. 271.

SUPPLEMENTARY INFORMATION:

BACKGROUND

On October 21, 1976, EPA promulgated a standard for vinyl chloride under the authority of section 112(b) (1) (B) of the Clean Air Act, as amended (41 FR 46561). The standard applies to ethylene dichloride, vinyl chloride, and polyvinyl chloride plants.

On November 19, 1976, the Environmental Defense Fund (EDF) petitioned the United States Court of Appeals for the District of Columbia Circuit to review the standard. Motions to intervene were subsequently filed on behalf of the Society of the Plastics Industry, Inc., the Goodyear Tire and Rubber Company and Air Products and Chemicals, Inc., and were granted by order of the Court on January 18, 1977. On March 24, 1977, EDF and EPA moved to dismiss the proceedings in view of a settlement agreement requiring EPA to take certain additional actions. These include a restatement of EPA's policy for regulating carcinogens under section 112 of the Clean Air Act; the proposal of amendments which would require increased efficiency of existing control equipment, require more stringent control at new sources, and prohibit increases in emissions within the vicinity of an existing source due to new construction; and the initiation of a review of the vinyl chloride standard three years after the promulgation of the amendments.

ZERO EMISSION GOAL

The vinyl chloride standard has been criticized for allegedly placing unwarranted emphasis on technological rather than health considerations. Although EPA disagrees with this criticism, it seems appropriate to restate EPA's approach to the regulation of carcinogens in general and under Section 112 of the Clean Air Act, and to explain how the vinyl chloride standard and the proposed amendments are consistent with this approach and with the protection of public health.

On May 25, 1976, EPA published interim procedures and guidelines for health risk and economic impact assessments of suspected carcinogens (41 FR 21402), which define EPA's approach to regulatory action for suspect carcinogens. As indicated in that publication, there are two steps involved in the decision-making process with regard to the regulation of a potential carcinogen. Although different EPA statutory authorities impose different requirements, in general two decisions must be made with regard to each potential carcinogen. The first decision is whether a particular substance constitutes a cancer risk. The second decision is what regulatory action, if any, should be taken to reduce that risk.

In deciding whether a cancer risk exists, EPA will consider a substance a presumptive cancer risk when it causes a statistically significant excess incidence of benign or malignant tumors in humans or animals. In the case of vinyl chloride, EPA evaluated all available data and concluded that a cancer risk exists. In deciding how and whether to regulate, EPA examined section 112 of the Clean Air Act. Section 112 of the Act requires that emission standards be set "at the level which in the judgment of the Administrator provides an ample margin of safety to protect the public health from such hazardous air pollutants." This requirement appears to assume that each pollutant regulated will have a threshold level of effects below which no health effects will occur. As explained in the documentation for the current standard (40 FR 59532, December 24, 1975; 41 FR 46560, October 21, 1976), it has not been possible to determine if there is a threshold level of effects for vinyl chloride and it is not certain that such a threshold may be determined in the near future. In the absence of strong evidence to the contrary, then, the only level of vinyl chloride which would appear to be absolutely protective of health is zero, which may be achievable only by banning vinyl chloride emissions completely. That, in turn, would require closing the entire industry. As explained in the earlier rulemaking it is not clear that Congress would have intended this result, so instead EPA required the lowest level achievable using technological means. (See 40 FR 59534 and 41 FR 46562).

In order to insure that the standard continues to approach the only level of emissions which is known to be absolutely protective of health, namely zero emissions, EPA is proposing amendments which require more efficient use of existing control technology at existing plants and more effective controls at new plants, and which encourage technology to reach this goal without banning vinyl chloride.

MORE STRINGENT STANDARDS FOR EXISTING SOURCES

EPA is proposing amendments which would require sources presently subject to a 10 ppm emission limit to reduce emissions to 5 ppm within three years of promulgation of the amendments. The affected sources include ethylene dichloride purification; vinyl chloride formation and purification; reactors, strippers; mixing, weighing, and holding containers; monomer recovery systems; and fugitive emissions which have been captured in accordance with the existing regulation.* If the owner or operator of a source believed that a control system would not be capable of meeting the 5 ppm limit, he would be able to request that the Administrator approve an interim emission limit for that source. Such requests would have to be made one year before the compliance date.. In requesting an interim emission limit, the owner or operator would have to submit supportive data and meet with EPA to discuss his particular problems in attaining compliance. The meeting would be announced in the FEDERAL REGISTER and any interested party would be allowed to attend and submit written or oral comments. If an interim emission limit were granted to the source, the required emission level would be specified in a written notification from EPA and in the FEDERAL REGISTER. Each source granted an interim emission limit would be reviewed every three years to determine whether emissions could be reduced to 5 ppm, or at least to a lower interim emission limit.

In proposing the reduction from 10 to 5 ppm, it is not EPA's intent that a control system which has been installed to meet the 10 ppm emission limit be removed and replaced with another more efficient control system or that a second control system be added behind the first control system. The purpose of the proposed amendment is to force owners and operators to maximize the effectiveness of existing control systems.

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*As an explanatory note, paragraph (b) of § 61.65 contains nine fugitive emission regulations. For several of these, the fugitive emissions are required to be captured and ducted to a control device meeting 10 ppm. According to the proposed amendments, the emissions from this control device would have to be reduced to 5 ppm in the same way any other source currently required to meet 10 ppm would have to do. Rather than incorporating both the 5 and 10 ppm emission limits in each paragraph in § 61.65(b), a separate paragraph (c) containing these emission limits is being added to § 61.65. All the other paragraphs in (b) are cross-referenced in paragraph (c).

MORE STRINGENT STANDARDS FOR NEW SOURCES

The proposed amendments would also require more stringent controls for new sources; i.e., sources for which construction is commenced after the date of proposal of these amendments. According to § 61.02 of the General Provisions, "commenced" means that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

New sources of types which would be subject to the 10 ppm emission limit under the current standard would be required under the amendments to meet a 5 ppm emission limit at the time of startup. With new sources there would be no provision allowing requests for EPA approval of an interim emission limit. New sources would be required to meet the more stringent emission limit at the time of startup, because they have an opportunity to design their equipment to meet the 5 ppm emission limit at the time construction is commenced. Existing sources, on the other hand, require time to maximize the effectiveness of their control systems.

The proposed amendment would also require ethylene dichloride-vinyl chloride plants to control emissions from new oxychlorination reactors to 5 ppm. This requirement is based on installation of a recycling and oxygen feed system with an incinerator or equivalent control device. The current standard limits emissions from the oxychlorination reactor to 0.2 g/kg (0.0002 lb/lb) of the 100 percent ethylene dichloride product from the oxychlorination reactor. This emission limit can be met by changing process parameters, rather than installing a control device. During the development of the current standard EPA considered requiring existing sources to control emissions with an incinerator or equivalent technology, but rejected this approach because a large quantity of fuel would be required to reduce emissions from a relatively small source. An existing oxychlorination reactor typically has a large volume, low hydrocarbon effluent gas stream, and large quantities of supplemental fuels would be required for combustion of its emissions.

A new plant can reduce the volume of its effluent gas stream and make it more concentrated by recycling the gas stream and using oxygen instead of air to feed into the process. (*3*, *4*) the current standard was not based on this technology because it was not considered feasible to retrofit existing plants so that they could use oxygen instead of air. The recycling and oxygen feed methodolgy is considered feasible for new oxychlorination reactors because it can be incorporated at the time of construction. Since the use of this technology would eliminate the supplemental fuel problem referred to above, it is EPA's judgment that new oxychlorination reactors should be controlled to the same extent that is proposed for other emission sources.

The proposed amendment also includes a more stringent emission limit for new polyvinyl chloride resins being processed in equipment following the stripping operation. That is, the amendment would apply to resins for which production for the purpose of marketing was commenced after the proposal of the amendment. The amendment would require all new resins except new dispersion resins to be stripped to 100 ppm and new dispersion resins to be stripped to 500 ppm. These limits for new products would be one-fourth of the limits contained in the standard for existing products. Consistent with the current standard, the amendment would permit the use of control devices rather than stripping technology to meet the emission limit. In this case equipment being used to process all new resins except new dispersion resins would have to be controlled to 0.01 kg/kg product and the equipment used for new dispersion resins would have to be controlled to 0.05 kg/kg product.

A "new source" is defined in 40 CFR 61.02 as a stationary source, the construction or modification of which is commenced after proposal of a standard. There was some question based on this definition as to whether the amendment to the stripping standard for new sources should apply to new polyvinyl chloride resins or the installation of new equipment following the stripper. If the applicability of the amendment for new sources were based on the installation of new equipment following the stripper, it would be difficult to determine what constitutes a new source at an existing plant. This is based on the reasoning that the stripping standard requires that all equipment following the stripper in the process be controlled as a unit. The series of equipment following the stripper includes pumps and conveying equipment which might be expected to be replaced on a frequent and routine basis. Replacing one of these pieces of equipment would in effect cause the whole series of equipment following the stripper to have to meet the standard for new sources. In other words, all resins processed in the series of the equipment would have to meet the lower standard even though only a minor part of the equipment had been replaced.

EPA decided that a more reasonable and direct approach was to make the proposed amendment apply to the production of new polyvinyl chloride resins. This is based on the reasoning that emissions from the equipment following the stripper are a function of the amount of vinyl chloride left in the resin after the stripping operation is completed; i.e., the resin is the source of the emissions rather than the equipment. The same equipment can be used to process different resin grades. Variations in the emissions from the equipment are a function of the resin being processed rather than the characteristics of the equipment. The control technology which is used for the equipment following the stripper is likewise more directly linked to the resin than the equipment. Stripping is used to control the emissions due to the vinyl chloride in the resin before the resin is processed in the equipment.

Before the hazards of vinyl chloride became known, stripping technology was employed by polyvinyl chloride manufacturers to recover raw materials for economic purposes. As a result of a standard promulgated by the Occupational Safety and Health Administration (39 FR 35890), some companies investigated improvements in stripping methodology for emission control purposes. (*1*)

Optimum stripping consists of a set of operating conditions which must be developed experimentally on an individual basis for the many resins. In developing the current standard, EPA recognized that stripping technology for dispersion resins had not been refined to the same extent as it had been for other resins and that there was more difficulty in stripping dispersion resins than other resins. For this reason a less stringent emission limit was established for dispersion resins. Dispersion resins are permitted a higher emission limit under the proposed amendment for the same reason.

EPA believes that for some resins, companies have already developed stripping technology which would meet the proposed amendment. (*2*) For other resins, the proposed standard would require additional improvement in stripping technology. If stripping technology has not been developed to the extent necessary to meet the proposed amendment for a particular resin, the manufacturer would have the option of developing the technology or not producing the resin.

The current standard, unlike the proposed amendment, was not based on the premise that an owner or operator would have the option of not producing a particular resin. It is EPA's judgment that the owner or operator making a new product has more freedom of choice than the owner or operator already making a particular product in selecting those resins which are to be produced. EPA's standard would be included in the variables under consideration when decisions are being made as to which resins are to be produced.

The proposed amendment would apply to any new source, whether it constituted replacement of an existing source in an existing plant, the expansion of an existing plant, or part of an entirely new plant. That is, if a new oxychlorination reactor or a new polyvinyl chloride reactor were installed at an existing plant, it would be subject to the emission limits for new sources. This means that as existing sources are gradually replaced with new sources in an existing plant, the overall emission level from that existing plant would be reduced.

EMISSION OFFSET

Because the present vinyl chloride standard focuses on reducing emissions rather than attaining a particular ambient air quality concentration, there is no provision for limiting the size of plants or the clustering of plants in a geographical area. The doubling of the size of an existing plant or the construction of a new plant beside an existing plant would considerably increase the ambient air concentrations of vinyl chloride in the vicinity of the plant(s) even if the vinyl chloride standard was met. EPA determined at the time of promulgation of the current standard that the costs of prohibiting the production of vinyl chloride and polyvinyl chloride were too high and the continued operation of existing plants should be allowed. EPA believes, however, that the standard should include a mechanism for prohibiting an increase in ambient concentrations of vinyl chloride due to new construction in areas where existing sources are already located.

Accordingly, EPA is proposing an amendment which would prohibit an increase in emissions within 8 kilometers (km) (approximately five miles) of an existing source due to the construction of a new emission source. This means that if a new source were added to an existing plant, the increase in emissions due to that new source would have to be offset by a reduction in emissions from other existing sources within that plant or at other plants within 8 km of the construction site of the new source. Similarly, a new plant could not be constructed within 8 km of an existing plant(s) unless the emission increase due to the new plant were offset by an emission reduction at the existing plant or plants. This provision may result in few existing plants being expanded and few new plants being constructed in the vicinity of existing plants. However, the proposed amendment does not preclude this possibility.

The offset provision would apply only to new construction which results in an increase in production rate. Replacing or adding equipment such as pumps, compressors, agitators, sampling equipment and unloading hoses is a routine practice at existing plants. Additions of equipment of this nature would, in and of itself, be expected to result in little, if any, increase in emissions. In EPA's judgment, a plant should not be required to prove this fact each time one of these pieces of equipment is added. The addition of this type of equipment in conjunction with major process equipment, however, is likely to result in both an increase in emissions as well as an increase in production rate, and is therefore covered by the offset provision.

If the offset provision were adopted, the reduction in emissions could be achieved in the production rate of an existing source or sources. The baseline emission rate would be determined based on the maximum production rate which had been attained by each existing source. The allowable emission rate for each source would be based on the maximum production rate at which that source would be operated in the future.

Also, if the emissions from an existing source were already below the emission limit applicable to it, the proposed amendment would give the source credit for the difference between the emission limit and the actual emission level. That is the baseline emission rate would be based on the standard rather than on an emission test. It is EPA's judgment that this is a more equitable approach than penalizing a source which has already taken measures to reduce emissions below the standard. Such a source would have less room for further reducing emissions.

The emission limits applicable to both the existing and new sources involved in the offset arrangement would be contained in the approval of new construction granted by the Administrator under 40 CFR 61.08.

EPA believes that a policy of no net increase in emissions due to new construction is justified because of the hazardous nature of vinyl chloride. However, EPA recognizes the potential difficulties in implementing such a policy and interested persons are urged to submit comments and factual information relating to this policy.

REVIEW OF STANDARD

EPA plans to undertake a full-scale review of Subpart F of 40 CFR Part 61 beginning three years from the promulgation of any amendments. In the study EPA will review information concerning technological advances in the control of vinyl chloride emissions to determine what further changes might then be appropriate to move toward the goal of zero vinyl chloride emissions. EPA will also consider recent health data to determine whether the approach for regulating vinyl chloride should be altered.

ENVIRONMENTAL IMPACT

The proposed amendment, in contrast to the current standard, would encourage the development of new technology and improvements in existing technology and would have the following three positive environmental impacts: (1) further reduction of emissions at existing plants, (2) no increase in emissions within 8 km of an existing source, and (3) lower emissions from new sources than would be accomplished through the current standard regardless of the construction site. These environmental impacts would provide progress toward the ultimate goal of zero emissions without banning vinyl chloride, and in the process would provide additional protection of public health by further minimizing the health risks to the people living in the vicinity of existing plants and to any additional people who are exposed as a result of new construction.

Specifically, for those existing sources which are currently subject to a 10 ppm emission limit, emissions would be reduced by half within three years after the promulgation date of these amendments. At both an existing average-sized ethylene dichloride-vinyl chloride plant and an existing average-sized polyvinyl chloride plant, which contain other sources than the ones required to meet a 5 ppm emission limit, it is estimated this will have the effect of reducing total emissions by less than one percent. Emissions at existing plants would be further reduced as existing oxychlorination reactors are replaced with new oxychlorination reactors and as new polyvinyl chloride resins are preduced to replace existing ones.

Under the proposed amendment, emissions from new plants would be considerably lower than they would be under the current standard. For a typical new average-sized ethylene dichloride-vinyl chloride plant (318×10^6 kg/yr or 700 $\times10^6$ lb/yr produced), the hourly emissions would be 5.1 kg (11.5 lb) instead of 10.3 kg (23.1 lb). For a typical new average-sized dispersion polyvinyl chloride plant (46×10^6 kg/yr or 100×10^6 lb/yr production), the emissions would be about 9 kg/hr (20 lb/hr) instead of 17.5 kg/hr (39 lb/hr) and for a typical new average-sized suspension polyvinyl chloride (68×10^6 kg/yr or 150×10^6 lb/yr production) the emissions would be 13.5 kg/hr) (30 lb/hr) instead of 16 kg/hr (36 lb/hr). These emissions are calculated based on the emission factors published in the documentation for the existing standard. (*1*) Ambient air concentrations are expected to be reduced proportionately.

The only negative environmental impact would be an increase in hydrogen chloride emissions at ethylene dichloride-vinyl chloride plants if incineration were used to control emissions from new oxychlorination reactors. However, due to the corrosion problems which would otherwise occur on plant property and in the community, plants are expected to use scrubbers to control the hydrogen chloride emissions. The proposed amendment is not expected to have a significant impact on energy consumption.

ECONOMIC IMPACT

The potential economic impacts of the proposed standard are:

(1) Costs for research and development of improved methodology for operation of existing control technology so that it can be used to meet the 5 ppm emission limit.

(2) Costs for research and development of improved stripping techniques to meet the standard for new polyvinyl chloride resins.

(3) Cost of research and development or licensing for converting over to the oxygen system for a new oxychlorination reactor.

(4) Possibly increased transportation costs of raw materials in the case that the offset policy results in the construction of a new plant farther from an existing plant than it otherwise would have been.

(5) Costs of building a new plant more than 8 km from an existing plant in the event that the offset requirement precluded the expansion of an existing plant.

(6) Delay in the production of a particular resin due to time spent developing stripping technology for that resin.

(7) No growth in the production of a particular resin due to the inability to strip that resin to required levels.

The types of costs which have been named would be difficult to quantify. The costs would be expected to vary considerably from one plant to another depending on the amount of research and development than had already been done, the extent to which technology could be transferred from other plants and processes, and the plans for new construction.

One area in which cost estimates can be generated is the use of an oxygen-recycle oxychlorination process as opposed to an air-based system. The proposed amendment does not require the use of the oxygen-recycle system, but many plants would be expected to employ this system to avoid the high costs of incinerating the high volume gas stream from a typical air-based system. The primary cost of using the oxygen-recycle system is the cost of the oxygen itself. The cost of the oxygen for a particular plant would depend on whether the plant was located where there is a considerable demand for both the oxygen and nitrogen products of air separation. According to one recent article, if it is assumed that such a demand exists, the cost of the oxygen ($14.34/ton) would be approximately equivalent to the cost of compressing air for use in the air-based system. (1) Another report in which this assumption was not made and the economics of the air and oxygen systems were being compared, it was concluded that overall production economics "favor the oxygen process even if vent gas incineration would not be required for an air-based plant since the sum of all remaining advantages offered by oxygen-based plant operation more than outweighs the incremental cost for the oxygen feed." (2)

Miscellaneous: The Administrator invites comments on all aspects of the proposed amendments.

(Section 112 of the Clean Air Act, sec. 4(a) of Pub. L. 91–604, 84 Stat. 1685 (42 U.S.C. 1857c–7) and section 301(a) of the Clean Air Act, sec. 2 of Pub. L. No. 90–148, 84 Stat. 504 as amended by sec. (15)(c)(2) of Pub. L. 91–604, 84 Stat. 1713 (42 U.S.C. 1857 g(a)). Secs. 61.67 and 61.68 also proposed under the authority of section 114 of the Clean Air Act, as added by sec. 4(a) of Pub. L. 91–604, 84 Stat. 1687 and amended by Pub. L. 93–319, sec. 6(a)(4), 88 Stat. 259 (42 U.S.C. 1857c–9).)

NOTE.—The Environmental Protection Agency has determined that this document does not contain a major proposal requiring preparation of an Economic Impact Analysis under Executive Orders 11821 and 11949 and OMB Circular A-107.

Dated: May 27, 1977.

DOUGLAS M. COSTLE,
Administrator.

REFERENCES

(1) *Standard Support and Environmental Impact Statement: Emission Standard for Vinyl Chloride*, EPA-450 12-75-009, October, 1975.

(2) "Goodrich Reports Impressive Progress in Solving Vinyl Chloride Problem," *American Paint and Coatings Journal*, Vol. 60, No. 31, January 12, 1976, p. 24.

(3) E. W. Wimer and R. E. Feathers, "Oxygen Gives Low Cost VCM," *Hydrocarbon Processing*, March 1976, pp. 81–84.

(4) Peter Reich, "Air or Oxygen For VCM?," *Hydrocarbon Processing*, March, 1976, pp. 85–89.

It is proposed that Subpart F of 40 CFR Part 61 be amended as follows:

1. In § 61.08, paragraph (b) is revised to read as follows:

§ 61.08 Approval by the Administrator.

* * * * *

(b) If the Administrator determines that a stationary source for which an application pursuant to § 61.07 was submitted will not, if properly operated, cause emissions in violation of the standard or violation of § 61.73, he will approve the construction or modification of such source.

* * * * *

2. Section 61.62 is revised to read as follows:

§ 61.62 Emission standard for ethylene dichloride plants.

An owner or operator of an ethylene dichloride plant shall comply with the requirements of this section and § 61.65.

(a) Ethylene dichloride purification: Except as provided in § 61.65(a), the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in ethylene dichloride purification is not to exceed the appropriate emission limit as follows:

(1) Each source for which construction had commenced on or before (date of proposal of these amendments), 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after the promulgation of these amendments).

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(b) Oxychlorination reactor: Except as provided in § 61.65(a), emissions of vinyl chloride to the atmosphere are not to exceed the appropriate emission limit as follows:

(1) Each source for which construction had commenced on or before (date of proposal of these amendments), 0.2 g/kg (0.0002 lb/lb of the 100 percent ethylene dichloride product from the oxychlorination reactor.

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(c) The requirements of this section do not apply to equipment that has been opened, is out of operation and met the requirement in § 61.65(b)(6)(i) before being opened.

3. Section 61.63 is revised to read as follows:

§ 61.63 Emission standard for vinyl chloride plants.

An owner or operator of a vinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Vinyl chloride formation and purification: Except as provided in § 61.65(a), the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed the appropriate emission limit as follows:

(1) Each source, for which construction had commenced on or before June 2, 1977, 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after promulgation of these amendments).

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(b) The requirements of this section do not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

4. Section 61.64 is amended by revising paragraphs (a)(1), (b), (c), (d) and (e) and by adding paragraph (f) as follows:

§ 61.64 Emission standard for polyvinyl chloride plants.

An owner or operator of a polyvinyl chloride plant shall comply with the requirements of this section and § 61.65.

(a) Reactor: The following requirements apply to reactors:

(1) Except as provided in paragraph (a)(2) of this section and § 61.65(a), the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each reactor is not to exceed the appropriate emission limit as follows:

(i) Each source for which construction had commenced on or before June 2, 1977 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after promulgation of these amendments).

(ii) Each source for which construction commenced after June 2, 1977, 5 ppm.

* * * * *

(b) Stripper: Except as provided in § 61.65(a), the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each stripper is not to exceed the appropriate emission limit as follows:

(1) Each source for which construction had commenced on or before June 2, 1977 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after final promulgation of these amendments).

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(c) Mixing, weighting, and holding containers: Except as provided in § 61.65(a), the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each mixing, weighing, or holding container in vinyl chloride service which precedes the stripper (or the reactor if the plant has no stripper) in the plant process flow is not to exceed the appropriate emission limit as follows:

(1) Each source, for which construction had commenced on or before (date

of proposal of these amendments), 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after promulgation of these amendments).

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(d) Monomer recovery system. Except as provided in § 61.65(a), the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from each monomer recovery system is not to exceed the appropriate concentration as follows:

(1) Each source for which construction had commenced on or before (date of proposal of these amendments), 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after promulgation of these amendments).

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(e) Sources following the stripper(s): The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) [or the reactor(s) if the plant has no stripper] in the plant process flow including, but not limited, to centrifuges, concentrators, blend tanks, filters, dryers, conveyor air discharges, baggers, storage containers, and inprocess wastewater.

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions:

(i) For a grade or grades of polyvinyl chloride resin which have been produced by the plant on or before June 2, 1977, the weighted average residual vinyl chloride concentration in all the grades processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed the appropriate emission limit as follows:

(A) 2,000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(B) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin;

(ii) For a grade or grades of polyvinyl chloride resin which have not been produced by the plant on or before June 2, 1977, the weighted average residual vinyl chloride concentration in all the grades processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, may not exceed the appropriate emission limit as follows:

(A) 500 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(B) 100 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping:

(i) For sources being used to process a grade or grades of polyvinyl chloride resin all of which had been produced by the plant on or before June 2, 1977:

(A) 2 g/kg (0.003 lb/lb) product from the stripper(s) [or reactor(s) if the plant has no stripper(s)] for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(B) 0.4 g/kg (0.004 lb/lb) product from the stripper(s) (or reactor(s) if the plant has no stripper(s)) for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

(ii) For sources being used to process any grade of polyvinyl chloride resin not produced by the plant on or before June 2, 1977:

(A) 0.5 g/kg (0.0005 lb/lb) product from the stripper(s) (or reactor(s) if the plant has no stripper(s)) for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis;

(B) 0.1 g/kg. (0.0001 lb/lb) product from the strippers (or reactor(s) if the plant has no stripper(s)) for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

(f) The requirements of paragraphs (b), (c), and (d) of this section do not apply to equipment that has been opened, is out of operation, and met the requirement in § 61.65(b)(6)(i) before being opened.

5. Section 61.65 is amended as follows:

A. By replacing the phrase "10 ppm" with the phrase "the appropriate emission limit specified in § 61.65(c)" in paragraphs (b)(1)(ii), (b)(2), (b)(3)(i), (b)(3)(ii), (b)(3)(iii), (b)(3)(iv), (b)(3)(v), (b)(5), (b)(6)(ii), and (b)(9)(ii);

B. By revising paragraph (c) and adding paragraph (d) as set forth below.

§ 61.65 Emission standard for ethylene dichloride, vinyl chloride, and polyvinyl chloride plants.

* * * * *

(c) The emission limit which is not to be exceeded is as follows: (1) Each source, for which construction had commenced on or before June 2, 1977, 10 ppm until (date three years after promulgation of these amendments) and 5 ppm after (date three years after promulgation of these amendments).

(2) Each source for which construction commenced after June 2, 1977, 5 ppm.

(d) The requirements in paragraphs (b)(1), (b)(2), (b)(5), (b)(6), (b)(7) and (b)(8) of this section are to be incorporated into a standard operating procedure, and made available upon request for inspection by the Administrator. The standard operating procedure is to include provisions for measuring the vinyl chloride in equipment ≥4.75 m^3 (1250 gal) in volume for which an emission limit is prescribed in § 61.65(b)(6)(i) prior to opening the equipment and using Test Method 106, a portable hydrocarbon detector, or an equivalent or alternative method. The method of measurement is to meet the requirements in § 61.67(g)(5)(i)(A) or (g)(5)(i)(B).

6. In § 61.67, paragraph (a) is revised to read as follows:

§ 61.67 Emission tests.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator of a source to which this subpart applies shall test emissions from the source as follows:

(1) For an existing source or a new source which has an initial startup date preceding October 21, 1976:

(i) Within 90 days following October 21, 1976, and

(ii) For those sources subject to §§ 61.62(a); 61.63(a); 61.64 (a)(1), (b), (c), and (d); and/or 61.65(b)(1), (b)(2), (b)(3), (b)(5), (b)(6), and/or (b)(9), within 90 days following (date three years after the promulgation date of these amendments).

(2) For a new source for which initial startup occurs after October 21, 1976, within 90 days of startup.

* * * * *

7. In § 61.68, paragraph (c) is revised to read as follows:

§ 61.68 Emission monitoring.

* * * * *

(c) A daily span check is to be conducted for each vinyl chloride monitoring system used. For all of the sources listed in paragraph (a) of this section, except for the one for which an emission limit is prescribed in § 61.62(b)(1), the daily span check is to be conducted with a concentration of vinyl chloride equal to the concentration emission limit applicable to it. For a source subject to the emission limit prescribed in § 61.62(b)(1), the daily span check is to be conducted with a concentration of vinyl chloride which is determined to be equivalent to the emission limit for that source based on the emission test required by § 61.67. The calibration is to be done with either:

* * * * *

8. A new § 61.72 is added to read as follows:

§ 61.72 Request for interim emission limit.

(a) If in the opinion of the owner or operator of an existing source, that source will be unable to comply with the 5 ppm emission limit in §§ 61.62(a)(1); 61.63(a)(1); 61.64 (a)(1)(i), (b)(1), (c)(1), (d)(1); and/or 61.65(c)(1) on or before (date three years after promulgation of these amendments), the owner or operator of that source may request that the Adminstrator approve an interim emission limit for that source. The request is to be in writing and is to be submitted to the Administrator within six months prior to (date two years after promulgation of these amendments). The request is to include:

(1) The reasons the source is incapable of being in compliance with the 5 ppm emission limit and data to support those reasons, and

(2) A suggested interim emission limit and description of the methodology for attaining that limit.

(b) Any owner or operator of a source who has submitted to the Administrator a written request for an interim emission limit in accordance with § 61.72(a), shall within 60 days of the date of the written request meet with the Administrator concerning the information contained in the request. The meeting is to be open to interested persons, who are to be allowed to submit oral or written testimony relevant to compliance of the source.

(c) The Administrator will within 120 days of receipt of the written request required by paragraph (a) of this section, notify the owner or operator in writing of approval or denial of approval of an interim emission limit.

(d) If an interim emission limit is approved the notification is to include the level of the interim emission limit, which may be the level requested or a more stringent one.

(e) A determination to deny approval of an interim emission limit is to set forth the specific grounds on which such denial is based.

(f) Approval for any interim emission limit granted for any source under § 61.72(c) shall expire three years from the date of issuance. The owner or operator may request an extension of approval for an interim emission limit or a lower interim emission limit. The request is to be in writing, is to be submitted within six months prior to a year before the expiration date and is to include the information listed in § 61.72 (b), (c), (d), and (e) are to apply.

9. A new § 61.73 is added to read as follows:

§ 61.73 Offset of emissions due to new construction.

(a) No owner or operator is to construct a new source which alone or in combination with other sources being constructed at the same time results in an increased production rate unless he demonstrates to the Administrator's satisfaction that such construction will not cause an increase in vinyl chloride emissions within 8 km of any other source which is subject to this subpart.

(b) Reduction in production rate is an allowable mechanism for attaining an offset in emissions.

(c) The baseline emission rate is to be determined based on the level of emissions allowable by the standard.

(d) Reducing emissions from an interim emission limit to the standard for a source is not an acceptable means of achieving an emission offset.

(e) In the application for approval of construction required by § 61.07, owners or operators of sources subject to this subpart shall include, in addition to the information required by § 61.07, the following information:

(1) The name, address, and location of any plant subject to this subpart which is located within 8 km of the proposed location of the source to be constructed.

(f) The emission limits applicable to both the new source(s) and the source(s) at which emissions are being reduced to balance the increase in emissions due to the new construction are to be established by the Administrator in the approval for construction required by § 61.08.

(Secs. 112 and 301(a) of the Clean Air Act, sec. 4(a) of Pub. L. No. 91-604, 84 Stat. 1683; sec. 2 of Pub. L. No. 90-148, 81 Stat. 504 (42 U.S.C. 1855c-7, 1857g(a)). Secs. 61.67 and 61.68 also issued under sec. 114 of the Clean Air Act, sec 4(a) of Pub. L. No. 91-604, 84 Stat. 1687 (42 U.S.C. 1857c-9).)

[FR Doc.77-15572 Filed 6-1-77;8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 61]

[FRL 775-2]

VINYL CHLORIDE

National Emission Standards for Hazardous Air Pollutants; Extension of Comment Period

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule.

SUMMARY: The deadline for submittal of comments on the amendments to the vinyl chloride standard which were proposed on June 2, 1977 (42 FR 28154), is being delayed from August 1, 1977, to August 19, 1977. The Society of Plastics Industry, Inc., because of the time required to make the proceedings from the public hearing available, has asked that the deadline for comments be delayed so that they will have ample opportunity to review the proceedings.

DATE: Comments must be received on or before August 19, 1977.

ADDRESS: Comments should be submitted (preferably in triplicate) to the Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, attention: Mr. Don R. Goodwin.

All public comments received may be inspected and copies at the Public Information Reference Unit (EPA Library), Room 2922, 401 M Street SW., Washington, D.C.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone 919-541-5271.

SUPPLEMENTARY INFORMATION: On June 2, 1977 (42 FR 28154), the Environmental Protection Agency proposed amendments to the vinyl chloride standard which was promulgated under the authority of section 112 of the Clean Air Act on October 21, 1976 (42 FR 46561). The notice of proposal requested public comments on the amendments by August 1, 1977.

On July 19, 1977, a public hearing on the proposal was held in Washington, D.C. The proceedings were made available to the Agency on July 28, 1977. Additional time was required to make copies of the proceedings and distribute them to interested parties. The Agency believes that an extension of the comment period through August 19, 1977, is justifiable.

Dated: August 2, 1977.

EDWARD F. TURK,
Acting Assistant Administrator for Air and Waste Management.

[FR Doc.77-22991 Filed 8-9-77;8:45 am]

[40 CFR Part 61]

[FRL 786-8]

VINYL CHLORIDE

National Emission Standards for Hazardous Air Pollutants; Extension of Comment Period

AGENCY: Environmental Protection Agency.

ACTION: Proposed rule, extension of comment period.

SUMMARY: The deadline for submittal of comments on the amendments to the vinyl chloride standard which were proposed on June 2, 1977 (42 FR 28154), is being delayed from August 19, 1977, to September 23, 1977. Due to the complexity of the issues which have been raised with regard to the proposed amendments, EPA believes that additional time is needed for submission of factual information to the Agency which can be used in evaluating the proposal.

DATE: Comments must be postmarked on or before September 23, 1977.

ADDRESS: Comments should be submitted (preferably in triplicate) to the Emission Standards and Engineering Division (MD-13), Environmental Protection Agency, Research Triangle Park, N.C. 27711, attention: Mr. Don R. Goodwin.

All public comments received may be inspected and copied at the Public Information Reference Unit (EPA Library), Room 2922, 401 M Street SW., Washington, D.C.

FOR FURTHER INFORMATION CONTACT:

Don R. Goodwin, Emission Standards and Engineering Division, Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone 919-541-5271.

SUPPLEMENTARY INFORMATION: On June 2, 1977 (42 FR 28154), the Environmental Protection Agency proposed amendments to the vinyl chloride standard which was promulgated under the authority of section 112 of the Clean Air Act on October 21, 1976 (42 FR 46561). The notice of proposal requested public comments on the amendments by August 1, 1977. On August 10, 1977 (42 FR 40452), in response to a request by the Society of Plastics Industry, Inc., EPA delayed the deadline for submittal of comments on the proposed amendments until August 19, 1977. The purpose of the delay was to allow ample opportunity for interested parties to review and comment on the transcript of the proceedings from the public hearing held on July 19, 1977.

A number of technological and legal issues have been raised on the proposed amendments both in statements made at the public hearing and in written comments received by the Agency. Because of the complexity of these issues, EPA has decided to extend the comment period to allow additional time for submitting factual data to the Agency which can be used in evaluating the proposal. EPA believes that an extension of the comment period through September 23, 1977, is needed for this purpose.

Dated: August 26, 1977.

Edward F. Tuerk,
Assistant Administrator for Air and Waste Management.

[FR Doc.77-25876 Filed 9-6-77;8:45 am]

ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

BENZENE EMISSIONS FROM MALEIC ANHYDRIDE PLANTS

SUBPART H

40 CFR Part 61

[FRL 1379]

National Emission Standard for Hazardous Air Pollutants; Benzene Emissions From Maleic Anhydride Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed standard would limit benzene emissions from maleic anhydride plants. Emissions from existing sources would have to be reduced to 0.30 kilogram of benzene per 100 lilograms of benzene fed to the reactor. No detectable benzene emissions would be allowed from new sources. this can be done by substituting another feedstock, such as n-butane, for benzene. Benzene emissions during a control system malfunction could not exceed those that would occur if the benzene feed were shut off to all reactors as soon as practicable after the malfunction began. A new test Method 110 is proposed for the determination of benzene emissions from stationary sources.

The proposed standard implements the Clean Air Act and is based on the Administrator's determination of June 8, 1977, that benzene presents a significant carcinogenic risk to human health as a result of air emissions from one or more stationary source categories and is therefore a hazardous air pollutant. The intent of the standard is to protect the public health with an ample margin of safety.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning both the listing of benzene as a hazardous air pollutant, which affects all benzene-emitting stationary sources, and the proposed standard for maleic anhydride plants.

DATES: *Comments.* Comments must be received on or before June 17, 1980.

Public Hearing. A public hearing will be held on May 20, 1980 beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by May 13, 1980.

ADDRESSES: *Comments.* Comments on the health effects of benzene and the listing of benzene as a hazardous air pollutant should be submitted (in duplicate, if possible) to: Central Docket Section (A-130), Attention: Docket No. OAQPS 79-3, Part I, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. Comments on the proposed maleic anhydride standard should be submitted to: Central Docket Section (A-130), Attention: Docket No. OAQPS 79-3, Part II, same address.

Public Hearing. The public hearing will be held at Olde Colony Motor Lodge North Washington and 1st St., Alexandria, Va. Persons wishing to present oral testimony should notify Ms. Shirley Tabler, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

Background Information Document. The background information documents for the proposed standard are contained in the docket and may be obtained from the U.S. EPA library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Benzene Emissions from Maleic Anhydride Plants—Background Information Document for Proposed Standard (EPA-450/3-80-001a), Assessment of Health Effects of Benzene Germane to Low Level Exposures, Assessment of Human Exposures to Atmospheric Benzene,* and *Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures.*

Docket. Docket No. OAQPS 79-3, Parts I and II, containing supporting information used in developing the proposed standard, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2903B, Waterside Mall, 401 M Street SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Don R. Goodwin, Director, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

Supplementary Information

Notice is hereby given that under the authority of Section 112(b)(1)(B) of the Clean Air Act, as amended, the Administrator is proposing a national emission standard for benzene emissions from maleic anhydride plants. The proposed standard is consistent with EPA's proposed *Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer* (see 44 FR 58642). As prescribed by section 112(b)(1)(A) of the Act, the proposal of this standard was preceded by the Administrator's determination that benzene is a hazardous air pollutant as defined in section 112(a)(1) of the Act. Accordingly, the Administrator revised the list of hazardous air pollutants on June 8, 1977 by adding benzene (42 FR 29332).

A Background Information Document has been prepared that contains information on the manufacture and processing of maleic anhydride, the available control technologies for benzene emissions, and an analysis of the environmental, energy, economic, and inflationary impacts of regulatory options. Information on the health effects of benzene is contained in documents prepared by or for EPA, entitled the *Assessment of Health Effects of Benzene Germane to Low Level Exposure,* the *Assessment of Human Exposures to Atmospheric Benzene,* and the *Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures.* The information contained in these documents is summarized in this preamble. All references used for the information contained in the preamble can be found in one of the four documents.

Proposed Standard

The proposed standard would apply to all maleic anhydride production units that process more than 500 megagrams (550 tons) of maleic acid, maleic anhydride, or both per year.

The proposed standard would limit the quantity of benzene that could be discharged into the atmosphere from each maleic anhydride production unit for which construction commenced on or before April 18, 1980 to 0.30 kilogram of benzene per 100 kilograms (0.30 lb/100 lb) of benzene fed to the reactor(s). Any maleic anhydride production unit for which construction or modification commenced after April 18, 1980 would be limited to no detectable benzene emissions as measured with the proposed Test Method 110; this standard could be met by using a feedstock such as n-butane rather than benzene for making maleic anhydride.

For existing sources, emissions in excess of the numerical emission limit would not be allowed during routine startup and shutdown of a plant. Emissions in excess of the numerical emission limit that are caused by control system failures would be allowed only if the plant owner or operator demonstrated to the Administrator's satisfaction that the emissions were unavoidable. Equipment failures that could have been prevented by proper design, operation, and maintenance would be considered avoidable. Emissions in excess of the numerical emission limit that are due to unavoidable control system failures could be no greater than the total uncontrolled mass emissions that would occur during a plant shutdown. Maleic anhydride plants using benzene as a feedstock would have to install continuous emission monitors for benzene and report the occurrence of emissions in excess of the numerical emission limit within 10 days of each occurrence.

Existing sources would have to comply with the standard within 90 days of its effective date, unless a waiver of compliance were obtained. A waiver of compliance could be granted by the Administrator for no more than 2 years from the promulgation date.

Summary of Health, Environmental, Energy, and Economic Impacts

The proposed standard would affect as many as eight existing plants that produce maleic acid, maleic anhydride, or both as an end product. The standard would also apply to one plant that produces maleic acid as an intermediate in the production of fumaric acid. Because EPA has only recently become aware of this plant, it is not included in the health, environmental, energy, and economic impacts discussed in this section, in the remainder of the preamble, or in the Background Information Document. This plant would be covered by the proposed standard, however, because available information indicates that there is no technical reason to exclude it. The process, emission sources, and appropriate control technology appear to be the same as for the other plants that produce maleic acid, maleic anhydride, or both as an end product. Information on this plant is being collected and will be included in the evaluations of health, environmental, energy, and economic impacts at the time of promulgation.

Because newly constructed or modified maleic anhydride production units could emit no detectable quantities of benzene, potential future benzene emissions from these sources would be prevented. No additional benzene health effects would result from the expansion of existing plants or the construction of new plants.

The proposed standard would require uncontrolled benzene emissions from existing maleic anhydride production units to be reduced by approximately 97 percent. The proposed standard would reduce nationwide benzene emissions from the plants that produce maleic anhydride as an end product when they are operating at full capacity from about 5,800 megagrams (6,400 tons) per year to 900 megagrams (990 tons) per year. As a result of this emission reduction, there would be an order of magnitude reduction in the estimated incidence of leukemia deaths for the 10 million people estimated to live within 20 kilometers (12.5 miles) of existing maleic anhydride plants.

A more significant health impact than reduction in incidence would be the reduction in risk to the most exposed individuals living near maleic anhydride plants. This risk reduction would occur because the magnitude of the incidence is a function of the number of people exposed and the level of control at various plants as well as the risk factor. In the case of maleic anhydride plants, there are only a few plants, many of which already have some controls. Thus, the greatest health benefit of the standard is for the population at highest risk; i.e., those people living close to one of the several uncontrolled plants. The risk to the most exposed group due to emissions from process vents occurs 500 meters (550 yards) from the average-sized plant, and the proposed standard would reduce it by two orders of magnitude. It is estimated that 4,000 people live within 500 meters and 2,000 people live within 100 meters (110 yards) of maleic anhydride plants. In addition, a reduction in other health effects associated with benzene exposure (such as cytopenia, aplastic anemia, and chromosomal aberrations) may be expected.

The control systems likely to be used to meet the standard (incineration or carbon adsorption) would also reduce emissions of other hydrocarbons that may be toxic and that contribute to oxidant formation and associated environmental problems. Furthermore, if incineration were used, carbon monoxide emissions would be reduced.

The reduction in national benzene emissions achieved with the proposed standard would be obtained with minimal adverse impacts on other aspects of the environment. These adverse impacts could include small increases in nitrogen oxide and sulfur oxide emissions into the air. There could be small increases in solid wastes and benzene in wastewater. Compliance with the proposed standard would increase national energy consumption by an estimated 310,000 gigajoules (GJ/yr) (50,000 barrels of fuel oil equivalent per year) by 1980.

The capital investment required by the domestic maleic anhydride industry to comply with the proposed standard would be about $6.6 million over the 2-year period from 1978 to 1980. The total annualized costs of the industry due to control system installation would increase by about $2.5 million per year by 1983, and maleic anhydride prices would increase overall by about 1.2 percent. In addition, during control system malfunctions, production levels may be decreased to achieve compliance with the standard. This could cause between 15 and 42 hours of lost production per year. For a typical plant with an annual capacity of 22,700 megagrams (50,000,000 pounds), there would be an estimated cost of $1,000 to $1,500 per hour of lost production. The costs of foregone production are difficult to quantify for the entire industry due to variations in plant design and operation and in market parameters. Furthermore, the proposed standard may result in one plant closure.

Rationale for Regulating Benzene Emissions Under the Authority of Section 112 of the Clean Air Act

Several activities by Federal agencies and a number of recent studies have increased public concern about exposure to benzene via inhalation. In September of 1976 and again in December of 1976, the National Institute for Occupational Safety and Health (NIOSH) recommended to the Occupational Safety and Health Administration (OSHA) that the Federal occupational exposure limit for benzene be reduced from a 10 parts per million (ppm) level for an 8-hour workday to 1 ppm. In January of 1977, OSHA issued nonenforceable guidelines to industry urging compliance with the NIOSH recommendations. In May, following receipt of a NIOSH study demonstrating that workers exposed to benzene are at considerable risk to leukemia, OSHA issued a temporary emergency standard that reduced the occupational limit from 10 to 1 ppm for an 8-hour daily exposure, OSHA promulgated that standard on February 10, 1978.

Following these actions by OSHA and NIOSH and in response to a petition from the Environmental Defense Fund (EDF), the Administrator announced in the June 8, 1977 Federal Register (42 FR 29332) his decision to list benzene as a hazardous air pollutant under Section 112 of the Clean Air Act. A "hazardous air pollutant" is defined as an ". . . air pollutant to which no ambient air quality standard is applicable and which . . . may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness."

Numerous occupational studies conducted over the past 50 years provide evidence of health hazards resulting from prolonged inhalation exposure to benzene. Benzene has been recognized since 1900 as a toxic substance capable of causing acute and chronic effects. Benzene attacks the hematopoietic system, especially the bone marrow, and its toxicity is manifested primarily by alterations in the level of the formed elements in the circulating blood (red cells, white cells, and platelets). The degree of severity ranges from mild and transient episodes to severe and fatal disorders. The mechanism by which benzene produces its toxic effects, although under investigation, is still unknown.

The adverse effects on the blood-forming tissues, including leukemia, have been documented in studies of workers in a variety of industries and occupations, including the manufacture or processing of rubber, shoes, rotogravure, paints, chemicals and, more recently, natural rubber cast film. These studies include single-case reports, cross-sectional studies, and retrospective studies of morbidity and mortality among a defined cohort of workers industrially exposed to benzene.

Based on a review of the entire set of studies taken as a whole, the Administrator concluded that benzene exposure is causally related to the induction of a number of blood disorders including leukemia (a cancer of the blood-forming system).* Although the studies which form the basis for this conclusion involve occupational exposure to benzene at levels higher than those found in the ambient air, the Administrator has "made a generic determination that, in view of the existing state of scientific knowledge, prudent public health policy requires that carcinogens be considered for regulatory purposes to pose some finite risk of cancer at any exposure level above zero" (44 FR 58646). Based on its widespread use, emissions of benzene into the ambient air have been determined to result in significant human exposure. For these reasons benzene emissions may reasonbly be anticipated to result in one or more serious effects that can be expected to lead to an increase in mortality or an increase in serious, irreversible or incapacitating, reversible illness. Therefore, the Administrator concluded that benzene satisfies the definition of "hazardous air pollutant" under Section 112 of the Clean Air Act.

The Administrator considered the alternative of taking no further action and relying instead on the OSHA standard for benzene and volatile organic compound (VOC) control under the State Implementation Plans (SIP's). Reliance on the OSHA standard was rejected because the current OSHA standard stipulates a level of benzene that cannot be exceeded in the work place. This work place standard is not expected to result in the control of emissions from stacks within maleic anhydride plants, such as those for the product recovery absorber and refining system.

VOC emissions, as potential precursors of photochemical oxidants, are now being regulated under State Implementation Plans (SIP's). The goal of SIP regulations for VOC's is to effect statewide compliance with the National Ambient Air Quality Standard (NAAQS) for photochemical oxidants. Because benzene is a VOC, SIP regulations for reducing VOC's from maleic anhydride plants would also reduce benzene emissions. However, a particular State may not need to control maleic anhydride plants to meet that standard or it may not need to control VOC's to the same extend as may be appropriate for benzene in light of its hazardous nature. Consequently, the Administrator rejected reliance on SIP's for control of benzene emissions from maleic anhydride plants.

Furthermore, use of the Toxic Substances Control Act was rejected as a mechanism for controlling benzene emissions from maleic anhydride plants because the Clean Air Act provides a more direct, expeditious route for regulating these sources. The Toxic Substances Control Act could be used, however, as a possible mechanism for placing a maximum limit on the amount of benzene in gasoline and for regulating benzene levels in solvents.

Selection of Maleic Anhydride Plants for Regulation

Benzene is emitted from mobile sources, the gasoline marketing system, chemcial manufacturing plants, petroleum refineries, coke byproduct plants, benzene storage and handling, and chemical plant fugitive emission sources. Of all benzene emissions, currently 80 percent of the nationwide benzene emissions are estimated to be from mobile sources and 20 percent from stationary sources. However, only stationary sources are subject to regulation under Section 112 of the Clean Air Act. Therefore, while benzene emissions from mobil sources are of concern from an agencywide regulatory standpoint, the proposed standards for maleic anhydride plants were developed as a result of establishing priorities for the stationary sources above.

Maleic anhydride process vents were selected as a stationary source category of benzene emissions for regulation for a combination of two reasons. First, maleic anhydride plants account for 35 percent of all stationary source emissions of benzene and are by far the largest source of benzene emissions in the chemical manufacturing industry. Second, estimates of cancer incidence and risk to the most exposed population have been calculated for stationary source categories of benzene emissions. All these source categories were then ranked from high to low, first for incidence and then for risk to the most exposed population. When both incidence and risk were weighed together, maleic anhydride process vents ranked as one of the higher priority source categories for regulation.

Selection of Sources Within Maleic Anhydride Plants to be Regulated

Maleic anhydride is produced primarily by benzene oxidation and to a lesser extent by n-butane oxidation. A small amount is also recovered as a byproduct from phthalic anhydride manufacture. Benzene is not used in the n-butane oxidation process or in phthalic anhydride manufacture and is not believed to be emitted to the atmosphere from these processes. The standard technically applies to all maleic anhydride plants. However, because no benzene is believed to be emitted from sources that do not use benzene as a feedstock, these source are not subject to the testing, continuous monitoring, or excess emissions reporting requirements included in the standard.

The proposed standard would apply to plants that produce maleic acid, maleic anhydride, or both as an intermediate, as well as to plants that produce maleic acid, maleic anhydride, or both as an end product. The economic and environmental impact analyses for the proposed standard include only those plants that produce maleic acid, maleic anhydride, or both as an end product because EPA only recently learned about the existence of one plant that produces maleic acid as an intermediate in the manufacture of fumaric acid. Although the plant was not included in the assessment of the environmental and economic impacts of the proposed standard, it is covered by the proposal because available information indicates that there is no technical reason to exclude it. The process, emission sources, and appropriate control technology appear to be the same as for the other plants that produce maleic acid, maleic anhydride, or both as an end product. This plant will be included in the assessment of the impacts of the standard at the time of promulgation.

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* Benzene has also been shown to be causally related to various cytopenias (decreased levels of a formed element in the circulating blood), aplastic anemia (a nonfunctioning bone marrow), and potentially inheritable chromosomal aberrations.

The sources of potential benzene emission to the atmosphere from plants using the benzene oxidation process and the quantity of benzene each emits at an average or model plant (producing 22,700 Mg/yr [50,000,000 lb/yr] of maleic anhydride) are:

Source	Emission rate	
	(kg/hr)	(lb/hr)
Product recovery absorber	190	420
Refining system	([1])	([1])
Storage and handling	1.8	4
Fugitive	0.8	1.8

[1] Undetermined

(These emission rates are based on the industry average benzene conversion rate in the reactor of 94.5 percent.)

The proposed standard would cover the maleic anhydride production unit, which includes the reactor; the product recovery absorber, which emits over 98 percent of the benzene emissions; and the refining system. The product recovery absorber consists of equipment in which a gas stream from the reactor containing maleic anhydride or maleic acid is contacted with an absorbent liquid to recover the maleic anhydride, maleic acid, or both as a mixture. The refining system consists of equipment used to keep refining columns, single- or multiple-effect evaporators, crystallizers, and other unit separation process equipment under negative pressure. The refining system emits only small quantities of benzene; however, because if has a small flow rate, it can easily be controlled by the same control device used for the product recovery absorber with minimal additional expense.

Fugitive, secondary, and storage and handling benzene emissions are being considered for regulation by generic benzene standards. These generic benzene standards would apply to a large number of similar chemical industries and processes that emit benzene. This approach would be taken to reduce the number of standards required to cover essentially the same benzene emission sources in several different industries. Consequently, fugitive, secondary, and storage and handling emissions are not covered in this standard.

The proposed standard would cover any facility that uses benzene to manufacture at least 500 megagrams (550 tons) of maleic acid, maleic anhydride, or both annually. This number was picked as a cutoff to differentiate between commercial-sized plants and laboratory facilities. Existing commercial-sized plants produce more than 500 megagrams (550 tons) each year.

Selection of Regulatory Options

Three alternative emission control techniques were examined for maleic anhydride plants. The first of these techniques, conversion to n-butane as the feedstock, represents the use of a substitute. The other two alternatives, control of benzene by recovery or oxidation through the use of carbon adsorption or incineration, represent add-on controls.

The n-butane oxidation process uses n-butane in place of benzene as the feedstock in producing maleic anhydride. Because the process is believed to have no benzene emissions, conversion of benzene-based plants to use n-butane as the feedstock can be considered a control technique that potentially eliminates benzene emissions. The benzene and n-butane processes appear similar. In both processes, the feedstock enters a reactor where it is oxidized with the aid of a catalyst to curde maleic anhydride, which is then passed through a series of refining columns and collected as a finished product. Conversion to n-butane as a feedstock would require at a minimum the installation of a different catalyst and the installation of new feedstock storage tanks where n-butane can be kept as a liquid under pressure or as a refrigerated liquid at atmospheric pressure. Little information is available, however, to indicate what, if any, other process changes might also be required or what their impacts would be.

Carbon adsorption and incineration can achieve various levels of control, depending on the design and operation of the devices. Factors influencing the efficiency of carbon adsorption systems for benzene control at maleic anhydride plants include: (1) the relative humidity of the incoming waste gas stream, (2) the presence of other organic compounds that may interfere with benzene adsorption or that may form polymeric materials on the carbon beds, (3) the temperature of the beds during adsorption, (4) the efficiency of the steam regeneration, (5) the dryness of the bed, (6) the carbon bed size, (7) the number of beds, and (8) the cycle time. A well-designed carbon adsorption unit at a maleic anhydride plant should have a preheater to lower the relative humidity of the incoming gases since they are normally saturated with water and should use a caustic scrubber for removing most of the other organics in the gases. After regeneration, the carbon bed, which is hot and saturated with water, should be cooled and dried by blowing organic-free air through it. The cooling air should be recycled to the carbon adsorption system. The bed size, number of beds, and cycle times can be varied to achieve the desired removal efficiency.

Two maleic anhydride plants currently use carbon adsorption. The system at one maleic anhydride plant for which data are available is reported to achieve a benzene removal efficiency ranging from 85 to 95 percent. This system does not use an organic-free air stream to cool and dry the beds after regeneration with steam. Immediately after regeneration, the waste gas stream containing benzene is directed to the hot bed. Consequently, until the bed cools and dries, benzene removal efficiency is low. This partially accounts for the relatively low overall benzene removal efficiency.

Factors influencing the efficiency of an incinerator are temperature, degree of mixing, and residence time in the combustion chamber. For maleic anhydride plants, a knockout demister tank is required ahead of the incinerator to prevent entrained liquid droplets from reaching the burner area. Supplemental fuel is required to maintain the necessary combustion temperature. Supplemental combustion air may also be required, if the incoming gas stream is not preheated. A temperature of 870° C (1,600°F) is required to ensure complete combustion of the waste gas, although it is possible that greater than 99 percent benzene removal can be obtained at lower temperatures in some cases.

Two maleic anhydride plants in the United States that use benzene as a feedstock control the product recovery absorber emissions with combusiton. The first plant routes the waste gas stream from the product recovery absorber through a waste heat boiler. This system is reported by the plant's owner to achieve a benezene removal efficiency as high as 99 percent. The combustion temperature is about 1,090° C (2,000° F), and the residence time is 0.8 second. A waste heat boiler, however, is only a viable control technique when there is a need for the additional steam. Maleic anhydride plants generally produce a surplus of steam.

The second plant controls the product recovery abosorber waste gas stream with a thermal incinerator that operates at 760° C (1,400°F) and has a residence time of 0.7 second. Emission test data indicate that a sustained benzene removal efficiency of about 97 percent is achievable.

Engineering experience with similar applications for the control of volatile organic chemicals indicates that a thermal incinerator can be designed and operated with a benzene removal efficiency of greater than 99 percent. Limited information is available concerning direct-flame afterburners used on maleic anhydride production facilities, but there are several cases in which streams similar to the product recovery absorber and refining system vent gas have been controlled at very high efficiencies. In one case, data reported for toluene indicate a removal efficiency of 99.9 percent at 766° C (1,410° F) and a residence time of 0.21 second. A second facility incinerates a toluene-xylene fume at 760° C (1,400° F) and is reported to achieve a destruction efficiency of 99.1 percent. A third installation also reports a removal efficiency greater than 99.8 percent at 760° C (1,400° F) for an organic stream considered as toluene. In addition, a review of several studies of incinerators indicates that combustion efficiencies less than 95 percent were achieved, except in one case, at temperatures of 730° C (1,350° F) or lower. Conversely, efficiencies greater than 99 percent were achieved at temperatures of 760° C (1,400° F) or higher.

Finally, recent laboratory studies on the thermal incineration of benzene show high benzene destruction efficiencies, which depend on temperature. Instrumentation with a benzene detection limit of two parts per millon by volume (ppmv) showed no residual benzene in gas streams following incineration at temperatures above 790° C (1,450° F) with residence times as low as 0.06 second.

The available information from the preceding paragraphs indicates that a conservatively designed and well-operated incinerator would be expected to consistently achieve at least 99 percent control of benzene at an operating temperature of about 870° C (1,600° F) and a residence time of 0.5 second.

These three emission control techniques for reducing benzene emissions from maleic anhydride plants lead to the following regulatory options:

(1) 97 percent benezene control, based on the best demonstrated level of control that is now being achieved at an existing maleic anhydride plant and that is universally applicable to any existing plant;

(2) 99 percent benzene control, based on technology transfer; and

(3) No detectable benzene emissions, based on conversion to n-butane as a feedstock.

Little information is available on what would be required to convert each existing benzene-based plant to an n-butane-based plant, or what the consequences of such a conversion would be. Based on the limited informaiton available, it appears that considerable effort continues to be directed towards developing n-butane technology, particularly the catalyst. Only the existing Amoco plant was originally designed to use n-butane as a feedstock. Problems associated with converting existing plants to n-butane include: (1) potentially signficant reductions in maleic anhydride production when current n-butane catalyst technology is combined with equipment designed for benzene as the feed stock, and (2) unsatisfactory operation resulting from equipment changes needed in the refining system. Because of uncertainties concerning the feasibility of converting each existing source to n-butane and the impacts of such conversion, this approach is not considered a viable regulatory option for existing sources based on best available technology (considering environmental, energy, and economic impacts) (BAT).

The use of n-butane as a feedstock, however, is considered a viable regulatory option for new sources. Because the industry was operating at only 56 percent of capacity in 1978, few new sources are expected to be built until the mid-1980's. This allows time for continued development of the n-butane process. Furthermore, a new plant could be designed to use n-butane and would therefore not encounter the potential problems associated with conversion. In fact, one company has recently announced the construction of a new 45,400-Mg/yr (50,000 tons/yr) maleic anhydride plant based on their proprietary n-butane technology, which is scheduled for completion in early 1983.

In summary, only two of the three options outlined above were considered viable regulatory options that could serve as the basis for a standard for existing sources based on BAT. These two regulatory options are designated: Option 1, 97 percent benzene control, and Option 2, 99 percent benzene control. For new sources, a regulatory option of no detectable benzene emissions (100 percent control) is considered a viable option as the basis for a standard based on BAT.

Selection of Basis of Proposed Standard—Existing Sources

One should note that neither Option 1 nor Option 2 specifically requires the use of carbon adsorption or incineration for control of benzene emissions from existing sources, nor would conversion to n-butane specifically be required for new sources. However, these control techniques were found to be feasible and were used as the probable contol methods in estimating the environmental, energy, and economic impacts of the regulatory options. Environmental, energy, and economic impacts were determined from a baseline assuming some benzene control. The numbers calculated for nationwide impacts are based on the assumption that all existing plants that have been using benzene as a feedstock will continue to be in operation and will continue to use benzene as a feedstock. Recently, one of these plants had indicated that is closing at least temporarily, and two of the plants have indicated they are investigating the possibility of converting to n-butane. If these changes occur, the numbers presented here for nationwide impacts on emissions, energy, and economics would be reduced. The impacts are summarized as follows.

Environmental Impact

The maleic anhydride industry was operating at only 56 percent of capacity in 1978 but is expected to be operating at 100 percent of capacity by the end of 1982. As the maleic anhydride industry increases production from 56 to 100 percent, nationwide unregulated benzene emissions would increase from about 3,300 Mg/yr to 5,800 Mg/yr (3,630 tons/yr to 6,380 tons/yr) based on 8,000 hours of operation per year. The term "unregulated" refers to the current level of control of benzene emissions from maleic anhydride plants. Some of these plants now practice some benzene control both voluntarily and in compliance with other standards but are not yet regulated by a national emission standard.

Option 1 would reduce nationwide benzene emissions from the maleic anhydride industry operating at 56 percent of capacity to about 650 Mg/yr (720 tons/yr) and operating at full capacity to 940 Mg/yr (1,030 tons/yr). Option 2, the more stringent option, would reduce nationwide benzene emissions to 440 Mg/yr (480 tons/yr) at 56 percent of capacity and 490 Mg/yr (540 tons/yr) at full capacity.

For the purpose of comparing the environmental impacts associated with no standard, Option 1, and Option 2 for an individual maleic anhydride plant, a model plant (i.e., and average-sized plant with a capacity of 22,700 Mg/yr [25,000 tons/yr]) was used. The total uncontrolled benzene emissions from the model plant—including the product recovery absorber; refining system; and fugitive, storage, and handling emission sources—are estimated to be 1,500 Mg/yr (1,650 tons/yr) at 56 percent of capacity and 2,800 Mg/yr (3,080 tons/yr) at full capacity. The total benzene emissions for the model plant under Option 1 are estimated to be 77 Mg/yr (85 tons/yr) when the plant is operating at 56 percent of capacity and 110 Mg/yr (120 tons/yr) when the plant is operating at 100 percent of capacity. The benzene emissions under Option 2 are estimated to be 46 Mg/yr (50 tons/yr) at 56 percent of capacity and 60 Mg/yr (66 tons/yr) at full capacity. The estimates for Options 1 and 2 assume that fugitive and storage emissions are uncontrolled.

A dispersion model was used to project ambient benzene concentrations attributable to uncontrolled emissions, emissions regulated to meet Option 1, and emissions regulated to meet Option 2. The projected maximum annual average benzene concentration for an uncontrolled model maleic anhydride plant occurred at a distance of 0.3 kilometer (330 yards) from the plant and was 0.01 ppmv. For either Option 1 or Option 2, the maximum benzene concentration occurred at 0.1 kilometer (110 yards) from the plant and was 0.006 ppmv under either option.

If an incinerator were used to comply with a standard based on either Option 1 or 2, it would emit nitrogen oxides (NO_x), less carbon monoxide (CO) than an uncontrolled plant, possibly some particulates, and sulfur oxides (SO_x). Under either option, emissions of NO_x are roughly estimated to be increased by about 10 Mg/yr (11 tons/yr) at a model maleic anhydride plant. If all plants were to install incinerators, nationwide emissions of NO_x would be increased by an estimated 65 Mg/yr (72 tons/yr). If an incinerator were used to control benzene, it would also control CO emissions from the process and their would be a net reduction rather than an increase in CO emissions.

It natural gas were used as the auxiliary fuel for incineration, the increase in particulate and SO_2 emissions would also be negligible. It is possible, however, that gas would be unavailable for incineration in some locations. In these locations, fuel oil could be used, and depending upon the type of fuel oil, there could be an increase in SO_2 and particulate emissions. Assuming, for example, a fuel oil of 0.3 percent by weight of sulfur were used, SO_2 emissions at a typical maleic anhydride plant would increase by about 5 Mg/yr (5.5 tons/yr) under Option 1 and about 15 Mg/yr (17 tons/yr) under Option 2. If all plants were to install incinerators burning fuel oil of this sulfur content, nationwide emissions of SO_2 would be increased by about 50 Mg/yr (55 tons/yr) under Option 1 and about 110 Mg/yr (120 tons/yr) under Option 2. These adverse air impacts are considered small in light of the alternative of unregulated benzene emissions.

Incineration does not lead to any wastewater effluents requiring disposal. Consequently, there would be no adverse water pollution impacts associated with a standard based on either Option 1 or 2, if incineration were used to comply with the standard.

A wastewater stream containing benzene is associated with using a carbon adsorption system. However, the organic load of the wastewater from carbon adsorption is less than 10 percent of the total organic liquid waste load from a model maleic anhydride plant. The wastewater stream from a carbon adsorption system could be recycled to the product recovery absorber or treated along with the other plant effluent since the organic liquid effluent from a carbon adsorber system is similar in character to the other waste liquid streams from the process. The organic liquid effluent resulting from the use of a carbon adsorption system is therefore estimated to have an insignificant incremental impact on water pollution.

Maleic anhydride plants typically have a wastewater treatment facility to handle process effluents containing organics. Benzene is biodegradable and could be handled in such a treatment plant. However, this wastewater could become a secondary source of benzene emissions, if the benzene were to evaporate to the atmosphere during treatment. If all the benzene were to evaporate, the benzene emissions from wastewater at a model plant would be about 40 Mg/yr (44 tons/yr). The possibility of regulating air emissions from wastewater treatment is scheduled for future study.

The only potential impact on solid waste disposal associated with either Option 1 or 2 is the handling of spent carbon from carbon adsorption systems. Typically, rather than being disposed of in a landfill, spent carbon is reclaimed and regenerated at special facilities. If, however, spent carbon were disposed of in a landfill; the amount of solid waste from this source would be about 7,400 kg/yr (3.4 tons/yr) and 7,600 kg/yr (3.5 tons/yr) from a model maleic anhydride plant using this control technique to achieve compliance with a standard based on Options 1 and 2, respectively. As mentioned previously, however, it is likely that the spent carbon would be reclaimed, and there would be no impact on solid waste disposal under their Option 1 or 2.

Energy Impact

Although process heaters are required at startup and during some operations, the heat released from the oxidation of benzene and other compounds in the reactor during normal operations produces a small energy surplus of about 15 kilojoules (kJ) per kilogram (6.5 Btu/lb) of maleic anhydride produced. For the model plant with a production capacity of 22,700 Mg/yr (25,000 tons/yr), the energy surplus would be about 340 gigajoules (GJ) (322,000 Btu) per year.

Carbon adsorption requires energy in the form of steam to desorb the benzene from the carbon and electrial energy for pumps and other equipment. The energy requirement for a model maleic anhydride plant using carbon adsorption to meet a standard based on Option 1 would be about 85,000 GJ/yr (80.6×10^6 Btu/yr) and to meet a standard based on Option 2, it would be about 90,000 GJ/yr (85.3×10^6 Btu/yr).

Thermal incineration requires energy directly as fuel. If a typical maleic anhydride plant used thermal incineration to meet a standard based on Option 1, the energy required would be about 45,000 GJ/yr (42.7×10^6 Btu/yr) and to meet Option 2, it would be about 95,000 GJ/yr (90.0×10^6 Btu/yr), assuming 50 percent heat recovery.

Assuming that half the existing maleic anhydride plants that required additional controls used carbon adsorption and that half used thermal incineration to comply with a standard based on Option 1, the impact of the standard would be an increase in national energy consumption of about 310,000 GJ/yr (293.8×10^6 Btu/yr). This is equivalent to about 50,000 barrels of fuel oil per year. The impact of a standard based on Option 2 under the same assumption would be an increase in national energy consumption of about 525,000 GJ/yr (497.6×10^6 Btu/yr). This equivalent to about 85,000 barrels of fuel oil per year. These impacts are considered small; compared to U.S. oil imports in 1978 of 3.0 billion barrels of oil, they are negligible.

Economic Impact

Control equipment costs were developed from a baseline of current controls. When costs were developed, it was assumed that existing control systems that are currently not meeting the level of the standard under Option 1 or Option 2 could not be upgraded and would have to be replaced with new control systems. Capital cost estimates were also based on control equipment designed to handle the waste gases from the product recovery absorber and refining system when operating at full production capacity. Cost estimates are considered accurate to ±30 percent.

For a model uncontrolled maleic anhydride plant with a capacity of 22,700 Mg/yr (25,000 tons/yr), compliance with a standard based on Option 1 would require a capital cost between $1.16 and $1.40 million, and compliance with a standard based on Option 2 would require a capital cost of about $1.22 to $1.44 million. The range in these estimates reflects the difference between using carbon adsorption and incineration as the control technique. These costs would increase the total capital expenditures of the average company that manufactures maleic anhydride by less than 1 percent. However, it should be noted that maleic anhydride sales generally represent less than 1 percent of the total sales for the average company that manufactures maleic anhydride.

Total annualized costs would be increased by about $354,000 to $442,000 per year for the model plant meeting a standard based on Option 1, depending on whether incineration or carbon adsorption were used as the control technique. If these costs were passed forward completely, the price of maleic anhydride would increase by about 1.2 percent, assuming current price levels and operation at 100 percent capacity.

Total annualized costs would be increased by about $369,000 to $600,000 per year for the model plant meeting a standard based on Option 2, depending on whether incineration or carbon adsorption were used as the control technique. If these costs were passed forward completely, the price of maleic anhydride would increase by about 1.7 percent, assuming current price levels and operation at 100 percent capacity.

In terms of national impact, Option 1 would require five plants to install controls. Total nationwide capital costs would be about $6.6 million. Option 2 would require at least seven plants to install control systems. Total nationwide capital costs under Option 2 would be about $9.1 million.

The increase in the industry's total annualized cost, assuming continued operation at 56 percent of capacity, would be about $2.2 million per year under Option 1 and about $3.9 million per year under Option 2. Assuming operation at 100 percent of capacity, total annualized industry cost would be increased by about $2.5 million per year under Option 1 and about $4.5 million per year under Option 2.

The impact of a benzene standard on the price of maleic anhydride would depend on at least two factors: (1) the percentage of capacity at which the industry is operating, and (2) the variation among companies with regard to price increases needed to fully pass through control costs.

In 1976, the industry was operating at 56 percent of capacity, and supply was substantially greater than demand. It is expected that demand will equal present listed capacity by the end of 1982 or sooner. The increased demand could reduce the competitiveness within the industry and allow maleic anhydride prices to increase to pay for control costs. Because controls to meet the standard would not have to be in operation before at least January of 1981, the potential price increases presented here are based on 100 percent utilization of listed capacity.

The price increase needed to fully pass through control costs varies from plant to plant. The estimated price increases presented here for Options 1 and are averages of the price increases that would be necessary for all the companies to fully recover their costs. This means that these estimated price increases would allow some companies to fully recover their control costs but would require other companies to absorb some of the costs. Companies that do not use benzene to make maleic anhydride or that already have control systems that would meet an option would incur no control costs and would not need a price increase. When the price increases for maleic anhydride were estimated, consideration was given to these plants with little or no control cost by averaging the price increases they would need to recover costs in with the price increases needed by the other companies.

Based on the assumptions discussed above, maleic anhydride prices would be expected to increase from a list price of 88¢/kg (40¢/lb) by about 1.2 percent if the standard were based on Option 1 and by about 1.7 percent if the standard were based on Option 2. There are two reasons for the differences in these estimated price increases. First, the cost of a control device to meet Option 2 is greater than for a control device designed to meet Option 1. Second, fewer plants would have to install controls to meet a standard based on Option 1 as opposed to Option 2.

Maleic anhydride is used in the manufacture of polyester resins, fumaric acid, and malathion. Any price increase in maleic anhydride is expected to be reflected in the price of these goods.

Based on an evaluation by EPA, one plant may close due to control costs regardless of the level of control selected as the basis for the standard. Based on conversations with representatives from another company and an independent evaluation by EPA, a second plant could close because of control costs if the standard is based on 99 percent control. Because this plant already has an incinerator that can attain 97 percent control, it would not cease to manufacture maleic anhydride if the standard is based on that control level.

This company expressed concern that, for a combination of reasons, it could not finance the control system that it would need at the 99-percent control level. One reason is that it could not pass through all the costs of control. The fact that the industry is expected to be operating at less than listed capacity when the company would need to begin making expenditures for control equipment would make it difficult to increase the price of maleic anhydride to compensate for those control costs. Furthermore, because this company has not been identified as a price leader, it may have to absorb some of the control costs even after the industry begins to operate closer to listed capacity. Also, the company is located in Texas and has to compete with imports of maleic anhydride from Mexico. A second reason the company probably cannot afford the controls is that within the last 4 years it has made a major capital outlay for the control device that meets the 97-percent control level, and it is still recovering from this investment. Furthermore, this company only makes two products, and maleic anhydride represents one-third of its sales. For other companies, maleic anhydride sales generally represent less than 1 percent of total sales. The product mix factor limits the ability of this company to use the profits from other operations to finance controls for the maleic anhydride plant.

This plant was originally designed to use 2-butene rather than benzene as the feedstock and has recently obtained a State permit to use n-butane. At least initially this company is planning to convert part of its capacity to n-butane on an experimental basis; it is uncertain whether it will convert to n-butane on a permanent basis. The company converted one reactor to n-butane on an experimental basis in 1975 and 1976 but converted back to benzene due to technical problems with the process and catalyst instability. If the plant did convert to n-butane on a permanent basis, it would not be affected by a benzene standard and would probably not close. If the plant could not successfully convert to n-butane and the standard were based on 99 percent control, the plant might have to close.

If both of these maleic anhydride plants closed, approximately 50 employees could lose their jobs. If the plant projected to close at either control level were the only plant to close, about 20 employees could lose their jobs. Because these employees would be petrochemical workers and both plants are located in areas with numerous other petrochemical plants (Texas and New Jersey), it is possible they could find employment in the same areas. Also, one of the companies is very large and may be able to relocate the employees from the maleic anhydride plant within the company.

In summary, it is estimated that a standard based on 99 percent control would result in total capital costs of about $9.1 million, an increase in total annualized costs of about $4.5 million, a potential price increase in maleic anhydride of 1.7 percent, an increase in energy usage of 85,000 barrels (bbl) (525,000 GJ/yr or 497.6 × 10^9 Btu/yr of oil per year, and as many as two projected plant closures. A standard based on 97 percent control would result in total capital costs of about $6.6 million, an increase in total annualized costs of about $2.5 million, a potential price increase in maleic anhydride of 1.2 percent, an increase in energy usage of about 50,000 bbl (310,000 GJ/yr or 293.8 × 10^9 Btu/yr) of oil per year, and as many as one projected plant closure.

In selecting best available technology (considering environmental, energy, and economic impacts) (BAT), the Administrator examined the impacts discussed and arrived at the following conclusions. First, control in the range of 97 percent is the best demonstrated control that has been achieved at an existing maleic anhydride plant with a control system that is applicable to all other existing plants. Higher levels, such as 99 percent, are believed to be technically feasible, but only with technology transfer and at a higher cost and energy use. Second, one plant that is not projected to close if the standard were based on 97 percent control is projected to close at the 99-percent control level if it cannot successfully convert to n-butane. Based on these two considerations, the Administrator selected the 97-percent control option as BAT.

After the 97-percent option was identified as BAT for existing sources, the estimated risks remaining after application of BAT were examined to determine whether they are unreasonable in view of the health benefits and costs that would result if a more stringent option were applied. The number of estimated leukemia deaths remaining after application of BAT to existing sources is estimated to range from 0.03 to 0.19 per year.[*] Fifty percent of these residual deaths would result from fugitive, secondary, and storage and handling emissions, which will be considered for regulation at a later date. After application of BAT to existing sources, the remaining estimated maximum lifetime risk of acquiring leukemia is estimated to range from 5.8 × 10^{-5} to 41 × 10^{-5} for the most exposed group living around a model uncontrolled maleic anhydride plant. Fugitive emissions, which are not covered by the recommended standard, are the predominant contributors to these risks. Maximum lifetime risk is the probability of someone contracting leukemia who is exposed to the highest maximum annual average benzene concentration for a period of 70 years. Farther from the plant, where process vents are the predominant contributors to risks, a standard based on BAT for existing sources would result in an estimated residual maximum risk caused by emissions from process vents only from 0.5 × 10^{-5} to 3.5 × 10^{-5}.

The Administrator considered two control levels beyond BAT for existing sources: 99 percent control, and the use of a feedstock other than benzene in the manufacture of maleic anhydride (100 percent control). Requiring 99 percent control instead of 97 percent control would reduce the estimated incidence of leukemia deaths within 20 km of maleic anhydride plants from a range of 0.03 to 0.19 per year to a range of 0.02 to 0.14 per year. It would reduce the estimated maximum lifetime risk at the point of maximum exposure caused by emissions from the process vents from a range of 0.5 × 10^{-5} to 3.5 × 10^{-5} to a range of 0.1 × 10^{-5} to 1.0 × 10^{-5}, while the maximum lifetime risk caused by emissions from all sources within a plant would remain unchanged.

On the other hand, requiring 99 percent control rather than 97 percent control would increase the capital cost from $6.6 to $9.1 million, the total annualized cost from $2.5 to $4.5 million, and the percentage increase in maleic anhydride prices from 1.2 to 1.7. It would also result in as much as one additional projected plant closure.

Requiring the use of a feedstock other than benzene in the manufacture of maleic anhydride would decrease both the estimated incidence of leukemia cases and the estimated maximum lifetime risk to zero. As discussed previously, a great deal of uncertainty exists concerning the technological changes required to convert each existing source to an alternate feedstock and the resulting economic impacts.

In view of the relatively small health benefits that would be gained with the additional costs (including as many as one additional projected plant closure) of requiring 99 percent rather than 97 percent control for the process vents and the uncertain economic impacts if a substitute feedstock were required for existing maleic anhydride sources, the Administrator concluded that the risks remaining after application of BAT to existing sources are not unreasonable. Therefore, the Administrator decided not to require more stringent control than BAT for process vents. This decision does not preclude future regulation of fugitive, storage, and secondary emission sources, which are major contributors to the residual risk.

Selection of Basis of Proposed Standard—New Sources

Requiring 100 percent control based on the use of an alternative feedstock, such as n-butane, is considered to be a viable BAT option for new sources because some of the previously discussed problems associated with converting existing sources to n-butane would not be present. In considering this option, the Administrator examined the potential safety, environmental, and economic impacts of that action to the extent possible given limited information.

The use of n-butane would result in no significant changes in the safety of the process and would slightly increase the overall safety of maleic anhydride production. For example, a higher concentration of n-butane (as compared to benzene) is required for an explosion to occur. In addition, inhalation of and exposure to n-butane by workers is less hazardous than exposure to benzene. n-Butane is already used as a feedstock for similar situations within the petrochemical industry.

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[*] The ranges contained in this preamble represent the uncertainty due to estimates that had to be made concerning the levels of benzene to which workers were exposed in the Infante, Aksoy, and Ott studies that served as the basis for developing the benzene risk factor. The ranges are based on a 95-percent confidence interval that assumes the estimated concentrations to which the workers are exposed very within a factor of two. In addition, there are other sources of uncertainty. The deaths were calculated based on extrapolation of leukemia risk associated with a healthy white male cohort of workers to the risk associated with the general population, which includes men, women, children, infants, the aged, nonwhites, and the unhealthy. Also, the number of deaths includes consideration of only one effect of benzene, leukemia. Benzene may cause aplastic anemia, cytopenias, and the development of chromosomal aberrations. In addition, the benefits to the general population of controlling other types of emissions from maleic anhydride manufacture have not been quantified. Furthermore, ambient benzene concentrations used to calculate the excess risks and deaths were derived from an atmospheric dispersion model with an error of a factor of two. Finally, there are inherent errors in estimating the population within 20 kilometers of existing plants.

There are two potentially adverse environmental impacts of requiring the use of n-butane in place of benzene as the feedstock for new sources. These include possible increased benzene emissions from gasoline marketing and increased volatile organic compound emissions. If eliminating benzene as a feedstock for new sources resulted in the addition of more benzene to gasoline, the incremental increase in total benzene emissions from gasoline marketing would be greater than if the benzene were used at a controlled maleic anhydride plant.

Because existing sources can continue to use benzene as a feedstock, only the benzene that would have been used at new sources would be of concern. Currently, benzene demand often exceeds the available supply; this situation is expected to continue through the 1980's. Consequently, the benzene that would be used at new sources, if there were no standard, is not currently being produced, and if new maleic anhydride plants wanted to use benzene as their feedstock, an increase in benzene demand would result.

Typically, when demand for benzene fluctuates, supply is adjusted by changing the level of production from the most expensive source. If benzene were not prohibited as a feedstock for new sources and there was little, if any, slack in the benzene supply, the additional benzene required would probably be supplied by toluene hydrodealkylation (HDA). HDA is the most expensive benzene production method and changes in benzene demand can be accommodated by changing the volume of benzene production from HDA. HDA production currently represents 25 to 30 percent of benzene production. Since existing maleic anhydride plants currently use 3 percent of the benzene produced, the HDA process should be able to accommodate fluctuations in demand for benzene caused by maleic anhydride producers.

If chemical process industries know that benzene will not be used as a feedstock for maleic anhydride production, they will presumably adjust their projections of future benzene demand. Additional benzene production capacity would be adjusted to reflect this decrease in demand for benzene as a feedstock for new maleic anhydride sources.

Thus, based on these considerations, it was concluded that the proposed standard would be unlikely to result in more benzene being added to the gasoline pool.

Although few data are available on the quantity and composition of the emissions of volatile organic compounds (VOC) from an n-butane-based plant, preliminary information indicates that total uncontrolled VOC emissions are higher than for a benzene-based plant. At present, there is no nationwide requirement to control the emissions from the n-butane oxidation process for maleic anhydride production. However, VOC emissions are currently controlled by State regulations where new n-butane-based plants are likely to be constructed. In addition, EPA is beginning work on a new source performance standard under Section 111 of the Clean Air Act for all air oxidation reactions in the organic chemical industry. This standard is anticipated to cover maleic anhydride production from n-butane.

The potential economic impacts of requiring n-butane include impacts on: (1) domestic licensors of n-butane and benzene technology, (2) availability and price of n-butane and benzene feedstocks, and (3) the economic life of existing maleic anhydride plants.

Only one domestic licensor of maleic anhydride technology exists. This licensor licenses both the benzene and n-butane processes. Abroad, there are five licensing companies. Of those five, only one licenses both benzene- and n-butane-based technology, while the other four solely license the benzene-based process. The U.S. licensor would probably maintain its foreign business because an EPA requirement would not affect usage of benzene-based technology abroad. However, the company's domestic business would depend on the competitive status of its n-butane catalysts at the time that benzene replacement is mandated. Because catalyst technology is usually a closely held company secret, the companies developing such catalysts and their rates of success with new catalysts have not been determined.

Use of n-butane as a feedstock can lead to as much as a 7.3¢ cost reduction per kilogram over benzene feedstock costs. This difference in feedstock costs is not expected to lessen in the next 10 years and may even increase. Supplies of n-butane are expected to exceed demand through 1990, while benzene demand will probably continue to exceed supply.

Requiring the use of n-butane for new sources would not affect the economic life of existing plants. Because of the cost advantage associated with using the n-butane feedstock, maleic anhydride manufacturers are likely to decide to use the n-butane process for new sources regardless of an EPA mandate to do so. For example, the only new maleic anhydride plant announced in recent years will be a 45,400-Mg/yr (50,000 tons/yr) plant based on proprietary n-butane technology. Construction is expected to be completed in 1983. Consequently, any impacts that occur on the economic life of existing plants from new plants using n-butane cannot be directly attributed to the EPA mandate.

In summary, the potential safety, environmental, and economic impacts associated with requiring new sources to use an alternative feedstock such as n-butane are minimal. Consequently, 100 percent control has been selected as BAT for new sources. Because this level of control is expected to result in no benzene emissions, it is not necessary to consider a level of control beyond BAT for new sources.

Excess Emissions

Because experience indicates that control systems are not 100 percent reliable, control system malfunctions and associated emissions in excess of the numerical emission limit for existing sources can be expected to occur at maleic anhydride plants. Even if a maleic anhydride source were shut down because of control system malfunction, there would still be emissions in excess of the level of the numerical emission limit during shutdown. For an average-sized plant with a capacity of 22,700 Mg/yr (25,000 tons/yr) and three reactors, it is estimated that 250 kilograms (550 pounds) of excess benzene emissions would occur during a controlled shutdown, assuming the plant is operating at the average benzene conversion rate of 94.5 percent. Although the benzene feed to a reactor could be stopped immediately, the benzene in the system would have to be purged to the atmosphere, which generally takes 15 to 20 minutes. Furthermore, if a plant had more than one reactor, the reactors would probably have to be shut down sequentially to avoid damaging the equipment. Most control system malfunctions at maleic anhydride plants can be repaired relatively quickly, within 12 hours at a maximum. Occasionally, a control system malfunction requiring extensive repair time can occur.

The Administrator considered four different regulatory options for the treatment of emissions in excess of the level of the numerical emission limit due to control system malfunctions at maleic anhydride plants: (1) allowing unlimited excess emissions, (2) requiring plants to shut down during control system malfunctions or to have no more emissions than if they did shut down, (3) requiring installation of a flare, and (4) allowing no excess emissions (i.e., essentially requiring installation of a backup control system that is equally efficient to the primary control system). The Administrator considered options only for treatment of excess emissions during control equipment failures. He did not consider allowing excess emissions during routine startup or shutdown or during process equipment failures based on the judgment that the air pollution control equipment at maleic anhydride plants is capable of preventing excess emissions during these periods.

The Administrator eliminated Options (1) and (3) based on a preliminary analysis. Option 1, allowing unlimited uncontrolled emissions during control system malfunctions, could significantly increase total mass emissions per year. For example, one existing maleic anhydride plant has had a control system malfunction that took about a year to repair. Although such events are expected to be rare, allowing uncontrolled emissions of benzene from maleic anhydride plants for this period of time was not judged appropriate. The next most stringent option (i.e., requiring plants to shut down or have no more emissions than if they shut down), could result in lost production but does not appear to be economically prohibitive. Therefore, the option of allowing unlimited excess emissions during control system malfunctions was not analyzed further.

The option of requiring a flare during a control system malfunction at first appeared to be a desirable option because flares could achieve some emission reduction during malfunctions of primary control systems and yet are generally less expensive than control systems such as incinerators and carbon adsorbers. However, traditionally, flares have not been used on sources, such as maleic anhydride plants, which have high-volume, low-concentration exiting gas streams. The control efficiency is not known but is expected to be considerably less than that of an incinerator or carbon adsorber for a high-volume, low-concentration stream. In addition, considerable quantities of natural gas would be required to flare the dilute waste gas stream found at maleic anhydride plants. The waste gas stream contains about 98 kcal/m^3 (11 Btu per standard cubic foot [SCF]), which is well below the levels for efficient use of flares. Therefore, up to 19,800 m^3/hr (700,000 SCF/hr) of natural gas would be required to operate the flare. Also, the flare would need to be operated from 5 to 20 hours per month in order to ensure rapid startup during control system malfunctions and to maintain it in efficient operating condition. This would require additional energy. For these reasons, the use of a flare during control system malfunctions did not appear to be a desirable control option for sources such as maleic anhydryde plants, which have high-volume, low-concentration waste gas streams.

Consequently, two regulatory options were further analyzed: Option 2, requiring plants to shut down during control system malfunctions or to have no more emissions that if they did shut down; and Option 4, allowing no excess emissions.

In order to estimate the costs that would result from allowing excess emissions equal to uncontrolled shutdown emissions, data on the frequency and duration of control equipment failures at two maleic anhydride companies were obtained. One company uses incineration and the other uses carbon adsorption. The company with the incinerator has experienced about 15 relatively short-term control equipment failures a year. If the approach under consideration were implemented, this company's plant could be operated in a modified manner with a reduced production rate during most malfunctions and have no more emissions than if it were shut down. Possible costs include 15 to 42 hours of lost production per year. It is estimated that the net cost of lost production would be $1,000 to $1,500 per hour for a plant with a capacity of 22,700 Mg/yr (50,000 tons/yr). Whether the total annual production would actually be reduced because of such a regulation would depend on whether the plant was operating at less than full capacity and thus could compensate for the lost production. The probability of a malfunction requiring extended repairs and complete shutdown because of the proposed regulation appears small.

The company with the carbon adsorber has found that most control device failures affect only one of the three beds. Such failures can be handled by reducing feed rates and operating the remaining two beds normally while the affected bed is isolated and repaired. Complete control device failure usually takes only 1 to 4 hours to repair. Therefore, the only possible result of the option of allowing excess emissions equal to shutdown emissions for a plant with carbon adsorption is again possible reduced production.

Because of several factors, the total industry cost of lost production that may result if this option were implemented is difficult to quantify without doing a detailed plant-by-plant analysis. Ordinarily, plants do not operate at full capacity for extended periods of time due to market, maintenance, or other conditions. Consequently, the production foregone during the time required to repair the control system can, in many cases, be made up by increasing production rates after the repair is completed. The extent to which this can be done is expected to vary from plant to plant and from time to time within a plant. Other factors, such as the type of control system used, the design of the plant, the number of reactors within a plant, the use of the steam produced during maleic anhydride production, and the nature and extent of the control system malfunctions are expected to vary from plant to plant and will affect the magnitude of production revenue actually foregone for the entire industry.

However, if the option of allowing excess emissions equal to those of shutdown were adopted, the ensuing costs are anticipated to result in no additional plant closures. Also, because only production curtailment would be involved, energy impacts and negative environmental impacts would not increase in relation to normal operation.

For the option of allowing no excess emissions during control system malfunctions (i.e., essentially requiring backup control systems), the model plant would incur additional capital costs of about $900,000 and an increase in annualized costs of about $223,000 above those costs without backup. The total capital costs for the industry (for both a primary and backup control system) would be about $13.9 million, the total annualized costs would be about $4.4 million, and the maleic anhydride price would increase about 2.0 percent. Furthermore, the same plant, which already has a 97-percent efficient incinerator and which is projected to close if the standard were based on 99 percent control, is also projected to close if it were required to install a backup control system.

In selecting BAT, the Administrator first examined the option of allowing no excess emissions. This option would more than double the industrywide capital costs. The Administrator rejected this option as BAT because he considered the increase in capital costs grossly disproportionate to the emission reduction achieved and because the plant closure projected to occur if he selected it could be eliminated by selecting the option of allowing excess emissions equal to those that would occur during shutdown. Because the impacts and costs of the option of not allowing excess emissions to exceed those that would occur during shutdown appear reasonable, he selected that option as BAT. This approach for selecting BAT for controlling excess emissions is similar to the approach used in determining BAT for continuous emissions. That is, it is based on the technologies and associated economic and environmental impacts specific to the source being regulated. Because the available technologies and associated impacts for controlling excess emissions from other sources regulated under Section 112 are likely to differ, it should not be assumed that BAT for controlling excess emissions from maleic anhydride plants will necessarily be applied to other sources.

In order to calculate the risks remaining after application of BAT to existing sources (i.e., a combination of 97 percent control during normal operation and allowing excess emissions during control system malfunctions equal to those during shutdown), the expected frequency of malfunctions was assumed to be 15 per year and the total quantity of uncontrolled emissions that would occur during shutdown was assumed to be 250 kilograms (550 pounds). A frequency of 15 malfunctions per year was selected for this analysis based on the data supplied by the plant with an incinerator. It is considered to be "worst case" because some of the control system breakdowns experienced by this company may have been avoidable and therefore would not be expected to occur if the proposed standard were in effect. Exposure estimates were obtained for the shutdown period and normal operation. The linear dose-response model was then used to calculate residual leukemia cases using both types of exposure.

The Administrator considered the possibility that when these short-term peak exposures, which may range up to 2.0 ppm for up to 3 hours duration, are mixed with chronic, relatively low exposures, the linear model may not provide conservative estimates of incidence and risk. This question arose because a recent study funded by the Consumer Product Safety Commission indicated that one exposure to a high level of vinyl chloride (another carcinogen regulated under Section 112) can result in a higher probability of cancer risk than the same dosage spread over a longer period of time. The exposure levels used in the vinly chloride study were much higher than benzene exposures that would occur around maleic anhydride plants during control system malfunctions. In addition, analysis of previous occupational benzene exposure studies—upon which calculations in the EPA *Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures* are based—shows that, for benzene concentrations with a range of 0.2 ppm to 4.0 ppm, the lifetime probability of cancer is approximately proportional to the concentration. Consequently, the linear model is valid for the range of ambient benzene levels anticipated to occur during control system malfunctions, and there is no reason to expect that peak exposures of up to 2 ppm would have a higher level of cancer incidence per part-per-million year of exposure than lower continuous exposures. For these reasons, the Administrator has judged that the linear model can be expected to provide conservative estimates of incidence and risk at the exposure levels that would occur during control system malfunctions at maleic anhydride plants. For different pollutants or sources with different emission characteristics, this relationship may not hold, and short-term peak exposures may indeed cause a higher level of cancer than indicated by the linear model.

The number of leukemia deaths remaining after application of BAT (including the allowance for emissions in excess of the level of the numerical emission limit) to existing sources was estimated to range between 0.026 to 0.18 per year within 20 km of the sources. The maximum lifetime risk from exposure to all sources within a plant to the most exposed population was estimated to be 5.8×10^{-5} to 41×10^{-5} and, from exposure to the process vents only, it was estimated to be 0.50×10^{-5} to 3.5×10^{-5}.

The Administrator next analyzed the option of allowing no excess emissions during control system malfunctions; i.e., requiring a backup control system equal in efficiency to the primary control system as an option beyond BAT. Thus, there would be a reduction in the estimated number of leukemia deaths from a range of 0.026 to 0.18 per year to a range of 0.025 to 0.17 per year. The estimated maximum lifetime risk from exposure to emissions from the process vents and to emissions from all sources within the plant would remain unchanged.

Requiring a 97-percent efficient backup control system in addition to a 97-percent efficient primary control system would increase the capital costs from $6.5 million to $13.0 million, the total annualized cost from $2.5 million to $4.4 million, and the percentage increase in maleic anhydride prices from 1.2 to 2.0. It would also increase the number of potential plant closures from one to two. After weighing the costs and benefits of selecting this option, the Administrator determined that the residual risks after applying a standard to existing sources based on BAT for controlling excess emissions would not be unreasonable. Therefore, the proposed standard is based on this level of control.

To limit the frequency of excess emissions due to control system malfunctions, control system malfunction is defined in the proposed standard as "any sudden and unavoidable failure of air pollution control equipment." This places the burden on the plant owner or operator to prove that emissions in excess of the numerical emission limit were unavoidable; i.e., no emissions in excess of the numerical emission limit would be allowed unless the Administrator were satisfied that an unavoidable equipment failure had occurred. Failures caused entirely or in part by poor maintenance, careless operation, deficiencies in design, or any other preventable upset conditions or preventable equipment breakdown would not be considered malfunctions. Recurring patterns in air pollution control equipment failure may be considered indicative of preventable failures.

Section 61.93 of the proposed standard includes requirements for implementing this approach. These requirements would be implemented in the following manner: Section 61.10 of the General Provisions requires submittal of an initial report from each existing source describing the source and emissions; Section 61.93 of the proposed standard would require that the initial report include information necessary for determination of the total uncontrolled mass emissions during a controlled shutdown of a source. The required information would consist of a description of the shutdown procedure at each plant, including a step-by-step account, the time period required for each step, and the amount of emissions expected to occur during each step. Emissions would be calculated based on the assumption that the plant is operating at full capacity with no control device. Using information gathered during development of the standard, the Administrator would review the information submitted by the source owner or operator and approve or disapprove the shutdown emissions included in the initial report as the allowable emission limit during a control system malfunction for that source. If a source changed in some way that affected shutdown emissions, the owner or operator would have to submit a second report and obtain approval for a revision in the allowable shutdown emissions for the source.

The proposed standard requires all sources that use benzene as a feedstock to install continuous monitoring systems. If the continuous monitor indicated that emissions had exceeded the numerical emission limit (averaged over three cycle times for carbon adsorbers or 3 hours for other control devices), these emissions would have to be reported to the Administrator within 10 days. If the owner or operator believed that the excess emissions resulted from an unavoidable failure of control equipment, he would state in the report that he believed the excess emissions were due to a control system malfunction. He would then include a description of the cause of the malfunction, the steps taken to remedy the malfunction, the steps taken or planned to prevent the recurrence of such a malfunction, documentation that the air pollution control or process equipment was at all times maintained and operated (to the maximum extent practicable) in a manner consistent with good practice for minimizing emissions, and any other evidence that the excess emissions were unavoidable. In addition, the owner or operator would be required to report the total mass of excess emissions and data documenting his calculation or measurements, including the duration of the control system malfunction as determined by flow meter measurements required under Section 61.95(a).

The Administrator would use the report and any other information requested or available to him to determine whether a malfunction had occurred. If the Administrator determined that a malfunction had occurred, he would use the information submitted to him and otherwise obtained to determine whether the total mass emissions exceeded those that would occur during a controlled shutdown (i.e., emissions that were calculated in conjunction with the initial report). The Administrator recognizes that, because the quantities of emissions that would occur during a controlled shutdown and during a control system malfunction and that would be reported to him would probably be calculated, they would not be as precise as if they were measured. If the Administrator determined that a malfunction did not occur and the emissions in excess of the numerical emission limit were measured with an emission test, the source would be considered in violation of the numerical emission limits in Section 61.92(a)(1). If, on the other hand, the Administrator determined that a malfunction did not occur and emissions in excess of the numerical emission limit were measured with a continuous monitoring system, the source would be considered in violation of Section 61.92(c). If the source exceeded the amount of excess emissions allowable under a controlled shutdown, it would be considered in violation of Section 61.92(b) or Section 61.92(c). Section 61.92(c) states that a source is to be operated in a manner consistent with good air pollution practice for minimizing emissions and that continuous monitoring data among other information can be used to determine whether that is the case.

Many times a plant may not be operating at capacity. In these situations, the actual emissions that would occur during a controlled shutdown of the plant would be less than those of the calculated controlled shutdown mass emission limit approved by the Administrator. This would allow the plant more emissions during a malfunction than would actually be emitted if the plant had an immediate controlled shutdown. However, for several reasons, operation at less than full capacity was not considered significant enough to warrant using less than 100 percent capacity as the basis for determining the controlled shutdown mass emission limit. The capacity at which a plant operates can fluctuate on a daily or even hourly basis depending on operational and market conditions. Consequently, the Administrator would be required to determine the plant's controlled shutdown mass emission limit every time a control equipment failure occurred.

In addition, one means of meeting the controlled shutdown mass emission limit would be for the plant to reduce its production rate. If the percent of capacity used to calculate the controlled shutdown mass emission limit were less than 100 percent, the extent to which the production rate could be reduced by the plant to comply with the mass emission limit would be severely limited. Consequently, if the plant were unable to use reduction in production rate as a means to comply with the mass emission limit during a control equipment failure, it might have to shut down completely. Because of technological and economic problems that could result if a plant frequently had to shut down completely, it might choose to install a backup control system. This option has been previously rejected as the standard. Therefore, the controlled shutdown mass emission limit is based on a plant operating at 100 percent capacity.

Selection of Designated Source

The designated source is the facility or grouping of facilities to which a standard applies. The proposed standard for maleic anhydride plants contains different emission limits for existing and new sources. An existing source is one for which construction is commenced on or before the date of proposal of the standard. A new source is one for which construction, modification, or reconstruction is commenced after the date of proposal of the standard. The manner in which the source is designated (i.e., the number of facilities included in the grouping) can affect whether or not a particular source is considered existing or new. Consequently, the manner in which the source is designated can influence the impacts of a standard. The Administrator considered these potential impacts in designating the source at maleic anhydride plants.

First he considered designating each different piece of equipment, such as a reactor, a product recovery absorber, and a refining system, as a source. However, maleic anhydride and maleic acid are produced using an integrated combination of reactor(s), a product recovery absorber, and a refining system. Typically, these pieces of equipment are designed on an integrated basis for the use of a specific feedstock, such as benzene. Consequently, if a feedstock change is made, extensive changes may have to be made not only in a reactor but also in the product recovery absorber and refining system integrated with the reactor.

If each piece of equipment were designated as a source and a reactor had to be replaced, the reactor would have to use a feedstock other than benzene. In addition, if the associated product recovery absorber and refining system had been designed for the operational conditions associated with the use of benzene as a feedstock, changes might also have to be made to them to allow the use of a feedstock such as n-butane. Furthermore, reactors are not replaced only because of old age. They are subject to explosion, in which case the owner or operator would be given no opportunity to plan conversion of all production equipment so the replacement reactor could use another feedstock.

Also, reactors may be operated in parallel with all emissions routed to a single product recovery absorber. If a reactor required replacement because of explosion or other damage, n-butane or another nonbenzene feedstock would be required for the new reactor, while the other reactors could continue to use benzene. But the associated product recovery absorber and refining system may still be designed for benzene use only. Such a situation could present operational problems. The Administrator has already decided not to require existing sources to convert to a nonbenzene feedstock. Designating individual pieces of equipment as the source could have essentially the same consequences. Therefore, he decided against this option.

Next, the Administrator considered designating as the source a maleic anhydride production unit; i.e., a functionally integrated combination of reactor(s), recovery absorber(s), and refining systems. In this case, if an existing reactor exploded and had to be replaced, the new reactor could use benzene. However, as this group of equipment aged and had to be substantially or partially replaced, the new grouping of equipment would have to use a nonbenzene feedstock. Similarly, if the capacity of a maleic anhydride plant was increased by adding a new grouping of this functionally integrated equipment, that equipment would have to use a nonbenzene feedstock. Designating the source in this way appeared to be most consistent with the Administrator's decision not to require conversion of existing sources to a nonbenzene feedstock because of technological and economic uncertainties. However, when a firm is preparing for major construction; i.e., substantially replacing existing equipment or increasing capacity, it has the opportunity to incorporate into its planning the use of a nonbenzene feedstock. In these cases, the Administrator considers requiring the use of a nonbenzene feedstock reasonable.

Therefore, the grouping of facilities designated as the source to which the proposed standard applies is a maleic anhydride production unit. If construction of a maleic anhydride production unit were commenced after proposal of the standard, it would be considered new. If a new maleic anhydride production unit were added to an existing plant, it would be considered new. If an existing maleic anhydride production unit were completely replaced or if it were partially replaced and met the criterion for being "reconstructed," it would be considered new. Due to the way in which "modification" is defined in Section 61.02(j), if capacity or other physical changes were made to an existing maleic anhydride production unit, such as the addition of a reactor, and if there were no concomitant increase in benzene emissions (in mass per unit time) from the unit, the unit would not be considered "modified" and would still be considered an existing source. If emissions did increase, however, the unit would be considered modified and new.

Selection of the Format of the Standard

A number of different formats could be selected to limit benzene emissions from existing sources. These include concentration standards, mass standards limiting emissions in terms of benzene per unit of maleic anhydride produced, and mass standards limiting emissions in terms of benzene per unit of benzene supplied to the reactor.

Typically, a concentration standard is preferred over a mass standard because a mass standard requires more measurements and conversion calculations. Exhaust gas flow rates and raw material or product flow rates have to be measured, and concentration measurements have to be converted to mass measurements.

The standard for maleic anhydride plants is based on two types of control devices—incineration and carbon adsorption. In both cases, there is a potential for air dilution. Excess air is used in incinerators to ensure complete combustion, and the quantity of excess air used can vary. Carbon adsorption systems use air to cool the bed during the regeneration cycle. The cooling air strips residual benzene remaining on the regenerating bed and consequently must be controlled in the bed that is in the adsorption phase of the cycle. Again, the quantity of cooling air used can vary among adsorption units. Due to the potential for air dilution, correction factors are necessary to ensure that measurements of emissions from all control devices are referenced to the same basis, and that the quantity of benzene emitted is the same no matter how much excess air is used in an incinerator or how much cooling air is used in a carbon adsorption unit.

If incinerators are used, correction factors referencing all calculations to a specific oxygen concentration level in the exhaust gases are a solution to the problem of using varying quantities of excess air. These factors, however, do not compensate for indirect air dilution resulting from combustion of more fuel and air than is necessary. This situation occasionally arises where steam boilers are pressed into service as incinerators. Even though the exit gas concentrations are low in these cases, the volume is so large that emissions are occasionally higher than if an incinerator were used. In any event, a concentration standard would require a measurement of exhaust gas oxygen concentration.

If carbon adsorption were used, the cooling air flow low rate and the total flow rate would have to be measured, and the cooling air flow rate subtracted from the total flow rate. Measurement of the cooling air flow rate to a regenerating bed could be difficult.

Alternatively, an oxygen correction factor could be used that references calculations to the oxygen concentration level of the absorber waste gas stream as it is released from the absorber. In this case, two measurements of oxygen concentration level would be required: the absorber waste gas stream and the exhaust gases discharged to the atmosphere.

In comparison, concentration, total flow rate, and benzene feed rate or the maleic anhydride production rate would have to be measured to calculate mass emissions. Maleic anhydride plants already measure the benzene feed rate because most plants must operate below the benzene explosive limit. Therefore, enforcement of a mass standard would require no more measurements and calculations than a concentration standard.

Also, it is possible that some expansion of existing plants might take place by the addition of n-butane oxidation reactors to an expanded existing maleic anhydride refining system, which also continued to refine maleic anhydride from benzene oxidation reactors. In this situation, the waste gas stream from the product recovery absorber would be a mixture of n-butane and benzene oxidation waste gases. As a result, enforcement of a concentration standard, or a mass standard limiting benzene emissions in terms of maleic anhydride production, would effectively give a source combining n-butane and benzene oxidation a higher emission limit than a benzene oxidation source of the same capacity. A mass standard limiting emissions in terms of benzene per unit of benzene supplied to the reactor, however, would avoid this potential problem. Therefore, this format has been selected to limit emissions from existing sources, both to avoid this problem and because this format would minimize required measurements for enforcement.

A mass standard limiting emissions in terms of benzene per unit of benzene supplied to the reactor, however, is not appropriate for new maleic anhydride production facilities. Since the basis for the standard for new sources assumes n-butane oxidation, new sources are expected to have no benzene emissions. However, the quantity of emissions considered to be "zero" depends on the measurement method. Consequently, the format to limit emissions from new sources is no detectable benzene emissions as measured with Test Method 110 specified in the proposed standard for benzene emissions from maleic anhydride plants.

Selection of Numerical Emission Limits

As discussed above, the format selected for the proposed standard as applied to existing sources was benzene emissions per unit of benzene fed to the reactor. Benzene emissions from a source are a function of the efficiency of the conversion of benzene to maleic anhydride and other organic byproducts in the reactor and the efficiency of the emission control device.

With regard to the reactor conversion efficiency, data available in published literature indicate that uncontrolled benzene emissions from the product recovery absorber and refining system represent 3 to 10 percent of the benzene fed to the reactor. This range in conversion efficiency is caused by variations in operating parameters, including the age of the catalyst. To include consideration of normal process fluctuation, a conversion efficiency of 90 percent was selected. Based on this conversion efficiency, the uncontrolled emission rate is 110 kilograms (22 pounds) of benzene emitted per 100 kilograms (220 pounds) of benzene fed to the reactors.

As discussed earlier, a control level of 97 percent has been selected as the basis for the proposed standard for existing sources. The numerical emission limit, therefore, is selected as 0.30 kilogram of benzene per 100 kg (0.30 lb/100 lb) of benzene fed to the reactor(s).

Selection of Emission Test Methods

The proposed emission test method for determining benzene emissions at sources using benzene as a feedstock is Method 110, which requires the use of a gas chromatograph with a flame ionization detector.

The averaging time selected for measuring benzene emissions by Test Method 110 at sources in maleic anhydride plants is based on the type of control device used. If a control device such as a carbon adsorber that operates in cycles is used, the averaging time for one run is equivalent to one cycle of the unit. Potential fluctuations in emissions may occur over the operating cycle of a carbon adsorber. Requiring that each run include an entire control device operating cycle ensures that these potential fluctuations in emissions are measured. A cycle in the monitoring of a carbon adsorption unit begins when air containing benzene is fed to the reactor and continues through the adsorption, desorption, and cooling and drying stages. For control devices such as incinerators, large fluctuations in emissions are not expected during normal operation, and the averaging time selected for each run was 1 hour. An emission test for benzene emissions is to consist of three contiguous runs as described above. The arithmetic mean of the results of three runs is to be used to determine compliance. Equivalent or alternative emission test methods may be used if they are approved by the Administrator.

Selection of Emission Monitoring Requirements

The objective of monitoring requirements is to provide a quick and easy means for enforcement personnel to ensure that an emission control system installed to comply with the standard is properly operated and maintained. For sources in maleic anhydride plants, the most straightforward means of ensuring proper operation and maintenance would be to monitor emissions released to the atmosphere. Preliminary indications are that a continuous emission monitoring system employing gas chromatography to measure benzene emissions would cost about $35,000. Since this cost is considered reasonable, the proposed standard includes monitoring requirements for plants using benzene as the feedstock.

Gas chromatography with a flame ionization detector, or an equivalent benzene monitoring system, is required. This system has to be operational prior to conducting the emission tests required under Section 61.93 so the continuous monitoring system can be evaluated.

The standard requires that the composition of reference gases used for the daily span check calibration of monitoring equipment be certified by the gas manufacturer. To certify composition, the concentrations of gases contained in each cylinder must have been determined by direct analysis with the analytical instrument being calibrated on the day of analysis. Calibration (Section 5.2.3.2 of Test Method 110) of the analytical procedure is performed using gases that have had their concentrations verified: (1) by comparison to gas mixture prepared in accordance with the procedure described in Section 7.1 of Test Method 110 and using 99 mole percent benzene, or (2) by direct analysis by the National Bureau of Standards.

The averaging time selected for determining the level of emissions with the continuous monitor is equivalent to the averaging time of an emission test; that is, three operating cycles for carbon adsorption systems, or 3 hours for other control systems.

Upon written application, the Administrator may approve alternative monitoring procedures or systems for specified conditions. For example, it is possible that a plant would be allowed to report benzene emissions in parts per million, instead of kilograms of benzene emitted per kilograms of benzene fed to the reactor, if it could demonstrate that it is meeting the standard using this method.

Public Hearing

A public hearing will be held to discuss the listing of benzene as a hazardous air pollutant under Section 112 and the proposed standard for maleic anhydride in accordance with Sections 112(b)(1)(B) and 307(d)(5) of the Clean Air Act. Person wishing to make oral presentations on the listing of benzene or the proposed standard for maleic anhydride plants should contact EPA at the address given in the *Addresses* section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the *Addresses* section of this preamble and should refer to docket number OAQPS 79-3.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see *Addresses* section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow members of the public and industries involved to identify and locate documents so they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed by Section 112, the proposal of this standard was preceded by the Administrator's determination that benzene is a hazardous air pollutant as defined in Section 112(a)(1) of the Act. Benzene was added to the list of hazardous air pollutants on June 8, 1977. The Administrator, however, will consider information alleged to show that benzene does not cause or contribute to air pollution that may reasonably be anticipated to result in an increase in mortality or an increase in serious, irreversible, or incapacitating, reversible illness.

In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulations, including health, economic, and technological issues, and on the proposed test method. Even though 97 percent control is the basis for the proposed standard, the Administrator has reserved the option of considering promulgation of a standard based on 99 percent control. For this reason, comments on the technological and economic aspects of requiring 99 percent control are specifically invited.

Recent information indicates that two benzene-based plants are considering conversion to an n-butane feedstock. In addition, one State has recently promulgated generic standards for toxic pollutants that may require more control of benzene than is currently assumed in the emission reduction estimates projected for this regulation. EPA will monitor these potential changes during the proposal period and evaluate their impact on emissions.

The Administrator welcomes comments on the appropriateness of the proposed regulation in light of these factors and invites suggestions and comments on alternatives to the NESHAP regulation to control benzene emissions from maleic anhydride plants. The Agency invites discussion of any alternative approaches that may achieve comparable health protection with less burden to EPA and to industry than Section 112 regulation. Specifically, the Agency requests comment on the feasibility and desirability of voluntarily developed compliance agreements, negotiated between a source and EPA or the State, as a means of assuring adequate control of these facilities.

Under EPA's sunset policy for reporting requirements in regulations, the reporting requirements in this regulation will automatically expire 5 years from the date of promulgation unless affirmative action is taken to extend them. To accomplish this, a provision automatically terminating the reporting requirements at that time will be included in the text of the final regulations.

This regulation will be reviewed 5 years from the date of promulgation. This review will include an assessment of such factors as new information on health effects, the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology.

Dated: April 4, 1980.

Douglas M. Costle,

Administrator.

It is proposed that Part 61 of Chapter I, Title 40 of the *Code of Federal Regulations* be amended by adding a new Subpart H, a new Test Method 110 to Appendix B, and a new Appendix C containing Supplements A and B to Method 110, as follows:

Subpart H—National Emission Standard for Benzene Emissions from Maleic Anhydride Plants

Sec.
61.90 Applicability and designation of source.
61.91 Definitions.
61.92 Emission standard and compliance provisions.
61.93 Excess emissions.
61.94 Emission test and procedures.
61.95 Emission monitoring.
61.96 Recordkeeping requirements.

Authority: Sec. 112, 114, and 301(a), Clean Air Act as amended [42 U.S.C. 7412, 7414, and 7601(a)], and additional authority as noted below.

Subpart H—National Emission Standard for Benzene Emissions from Maleic Anhydride Plants

§ 61.90 Applicability and designation of source.

(a) The provisions of this subpart are applicable to the following source: any maleic anhydride production unit that produces a total of 500 Mg or more per year of maleic anhydride, maleic acid, or both, either as an end product or as an intermediate product.

§ 61.91 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

(a) "Continuous monitoring system" means the total equipment used to sample, to analyze, and to provide a permanent record of emissions or process parameters.

(b) "Control system malfunction" means any sudden and unavoidable failure of air pollution control equipment. A failure caused entirely or in part by deficiencies in design, poor maintenance, careless operation, or other preventable upset condition or preventable equipment breakdown is not considered a malfunction.

(c) "Controlled shutdown" means the termination of benzene feed to the reactor(s) in a manner that results in the least amount of benzene emissions without damage to air pollution control or process equipment.

(d) "Maleic anhydride production unit" means any functionally integrated combination of reactors, product recovery absorbers, and refining systems used to produce maleic anhydride or maleic acid.

(e) "Product recovery absorber" means any equipment in which a gas stream containing maleic anhydride or maleic acid is contacted with an absorbent liquid to recover the maleic anhydride, maleic acid, or both as a mixture.

(f) "Reactor" means any vessel in which benzene or an other feedstock is partially or totally oxidized to maleic anhydride or maleic acid.

(g) "Refining system" means equipment used to separate maleic anhydride or maleic acid from other material or liquid and to dehydrate maleic acid to maleic anhydride. It also includes pieces of equipment used to keep refining columns, evaporators, crystallizers, and other unit separation process equipment under negative pressure.

(h) "Run" means the net period of time during which an emission sample is collected.

(i) "Reconstruction" means the replacement of components of an existing source to such an extent that:

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable, entirely new source; and

(2) It is feasible, considering economic impacts and the technological problems associated with retrofit, to meet the applicable standard for new sources set forth in this subpart.

(j) "Fixed capital cost" means the capital needed to provide all the depreciable components.

§ 61.92 Emission standard and compliance provisions.

(a) No owner or operator of a source to which this subpart applies shall cause benzene to be emitted into the atmosphere from the source in excess of the appropriate emission limit as stated below:

(1) Existing source—0.30 kg/100 kg of benzene fed to the reactor(s), averaged over three cycles for carbon adsorbers or over 3 hours for other control systems. This emission limit does not apply during a control system malfunction if the Administrator has approved a controlled shutdown mass emission limit under § 61.93.

(2) New source—no detectable benzene emissions as measured with Test Method 110.

(b) For the duration of a control system malfunction, no owner or operator of a source to which this subpart applies shall cause the total mass of benzene to be emitted from the source in excess of the controlled shutdown mass emission limit, established under § 61.93(a), applicable to the source.

(c) The owner or operator of each source shall maintain and operate the source including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing benzene emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator, which may include but is not limited to monitoring results, review of operating and maintenance procedures, and inspection of the source.

(d) Upon reconstruction, an existing source shall become a new source for purposes of this subpart.

§ 61.93 Excess emissions.

(a) Controlled shutdown mass emission limit. (1) The owner or operator of each source subject to the emission limitations in § 61.92(a)(1) and who uses benzene as a feedstock shall include in the initial source report required under § 61.10, a calculation of the total uncontrolled mass benzene emissions that would occur from each source for which an emission limitation is prescribed under § 61.92(a)(1) during a controlled shutdown. The following information is also to be included:

(i) A complete step-by-step description of the controlled shutdown procedure for each process for which an emission limitation is prescribed under § 61.92(a)(1), including an account that details each step in the procedure.

(ii) The length of time it takes for each step of the controlled shutdown, from initiation to completion.

(iii) The amount of benzene emissions computed to occur in the absence of air pollution control equipment during each step of the controlled shutdown based on production rates for the process running at full capacity.

(2) The Administrator shall, within 60 days of receipt of the information specified in paragraph (a)(1) of this section, notify the plant owner or operator whether he approves or disapproves, as the numerical emission limit applicable during a control system malfunction, the benzene emissions computed to occur during a controlled shutdown in accordance with paragraph (a)(1) of this section. In making this determination, the Administrator shall consider the information submitted under paragraph (a)(1) of this section. The Administrator may also consider any other information available to him or that he may reasonably require, in addition to sound engineering practices.

(b) *Excess emissions reporting.* (1) For each occurrence of benzene emissions in excess of the numerical emission limit, specified in § 61.92(a)(1), the owner or operator of that plant shall report the occurrence to the Administrator within 10 days after the occurrence. Emissions in excess of the numerical emission limit are those indicated by measurements by an emission test or by a continuous monitoring system over the following period of time.

(i) When a control device is used that operates in cycles, such as a carbon adsorber, all periods equivalent to three contiguous cycles of the control device during which the average emissions exceed the appropriate numerical emissions limit in § 61.92(a)(1). The emissions measured for any one cycle are to be used in calculating an average only once; running averages are not required.

(ii) When any other control device is used, all 3-hour periods during which the average emissions exceed the appropriate numerical emission limit in § 61.92(a)(1). The emissions measured for any one cycle are to be used in calculating an average only once; running averages are not required.

(2) The owner or operator shall submit the following information as a minimum in the report required by paragraph (b)(1) of this section:

(i) The identity of the stack and other emission points where the excess emissions occurred.

(ii) The identity of the equipment causing the excess emissions.

(iii) The owner or operator shall also state whether or not he believes a control system malfunction has occurred.

(3) If the owner or operator states that a control system malfunction has occurred, the following information as a minimum is also to be included in the report required under paragraph (b)(1) of this section:

(i) The total mass of benzene emissions that occurred during the control system malfunction.

(ii) The nature and cause of the excess emissions.

(iii) The steps taken to remedy the malfunction and the steps taken or planned to prevent the recurrence of such malfunctions.

(iv) Documentation that the air pollution control equipment, process equipment, or processes were at all times maintained and operated, to the maximum extent practicable, in a manner consistent with good practice for minimizing emissions, and were designed in accordance with good engineering practices.

(v) Continuous monitoring data, operating data, and calculations used in determining the magnitude of excess emissions, including but not limited to—

(A) The time and duration of the control system malfunction;

(B) The benzene feed rate to the reactors at the beginning of and during the control system malfunction;

(C) The benzene conversion rate in the reactor at the beginning of and during the control system malfunction;

(D) The production rate at the beginning of and during the control system malfunction; and

(E) The uncontrolled benzene emission rate during the control system malfunction in kilograms per 100 kilograms of benzene to the reactor.

(4) The Administrator shall determine whether a contol system malfunction has occurred based on the data submitted under paragraphs (b) (2) and (3) of this section. In making this determination, the Administrator may also consider any other information available to him or that he may reasonably require, in addition to sound engineering practices. If the Administrator determines that a control system malfunction has occurred, he shall determine whether the emissions in excess of the emission limits established in accordance with paragraph (a) of this section have been exceeded. The Administrator shall notify the owner or operator of this determination in case of violation within 60 days after receipt of the report required under paragraph (b) of this section.

§ 61.94 Emission test and procedures.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator subject to the provisions of this subpart shall test emissions from all existing sources in which benzene is used as a feedstock within 90 days of the effective date.

(b) The owner or operator of each source shall provide the Administrator 30 days prior notice of the emissions test to afford the Administrator the opportunity to have an observer present.

(c) Any emission test is to be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated.

(d) Where possible, each sample is to be analyzed within 24 hours, but in no case later than 72 hours of sample collection. Emissions are to be determined within 30 days after the emisson test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.

(e) The owner or operator shall retain at the plant and make available, upon request, for inspection by the Administrator, for a minimum of 2 years, records of emission test results and other data needed to determine emissions.

(f) The owner or operator shall use the following test methods to determine benzene emissions from any source for which an emissions limit is prescribed in § 61.92, unless an alternative or equivalent method has been approved by the Administrator. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) Test Method 1 of Appendix A to Part 60 is to be used to determine sample and velocity traverses.

(2) Test Method 2 of Appendix A to Part 60 is to be used to determine velocity and volumetric flow rate.

(3) Test Method 110 of Appendix B to this part is to be used to determine benzene emissions from any source for which an emission limit is prescribed in § 61.92.

(g) Each emission test is to consist of three runs. One sample containing a minimum volume of 50 liters corrected to standard conditions, is to be collected for each run. For the purpose of determining emissions, the average of the results from all three runs is to apply. The average is to be computed on a time-weighted basis.

(h) Where a control device is used that operates in cycles, the sampling time for each run is the time period of one complete cycle. Where any other control device is used, sampling time is to be taken over a minimum of 1 hour.

(i) The sampling site is to be at least two stack or duct diameters downstream and one-half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. The sampling point in the duct is to be at the centroid of the cross section. The sample is to be extracted at a rate proportional to the gas velocity at the sampling point. For a rectangular cross section an equivalent diameter is to be determined from the following equation:

$$\text{equivalent diameter} = \frac{2\,(\text{length})(\text{width})}{\text{length} + \text{width}}$$

(j) The reactor feed rate is to be determined during each testing period by a method approved by the Administrator.

(k) The mass emissions in kilograms of benzene per 100 kilograms of benzene fed to the reactor are to be computed by using the following equation:

$$E_B = \frac{[C_B\ (3.24)\ Q \times 10^{-6}][100]}{P_{BM}}$$

where

E_B is kg of benzene/100 kg of benzene fed to the reactor.

C_B is the concentration of benzene as measured by Test Method 110 (ppmv).

3.24 is the vapor density of benzene at 1 atm and 20° C in kg/m^3.

Q is the volumetric flow rate in m^3/hr as determined by *Reference Method 2* of Appendix A to Part 60 of this chapter.

10^{-6} is the conversion factor for ppm.

P_{BM} is the benzene feed rate to the reactor in kg/hr.

(Sec. 114, Clean Air Act as amended [42 U.S.C. 7414])

§ 61.95 Emission monitoring.

(a) The owner or operator of each source to which this subpart applies shall install and use a continuous monitoring system to monitor the concentrations of benzene emissions discharged to the atmosphere from all existing sources that use benzene as a feedstock. The owner or operator shall also monitor the quantity of benzene fed per hour to each reactor and the exhaust gas flow rate from any device that may discharge benzene emissions into the atmosphere. He shall use the data required to be collected by this paragraph to calculate total mass emissions of benzene in kilograms per 100 kg of benzene fed to the reactor in accordance with the equation in § 61.94(k).

(b) The continuous monitoring system to be installed in accordance with paragraph (a) of this section is to be a device that obtains air samples from one or more emission points on a continuous, sequential basis and analyzes the samples by gas chromatography using a flame ionizaton detector.

(c) When the effluents from a single source or two or more sources subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable continuous monitoring systems on each effluent or on the combined effluent. When the sources are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each effluent. When the effluent from one source is released to the atmosphere through more than one point, the owner or operator shall install applicable continuous monitoring systems on each separate effluent unless the installation of fewer systems is approved by the Administrator.

(d) All continuous monitoring systems are to be installed so that representative measurements of emissions are obtained and are to be operational prior to conducting emission tests under § 61.94. Verification of operational status is to consist of, at the minimum, completion of the manufacturer's written requirements or recommendations for checking the operation or calibration of the device.

(e) During any emission tests required under § 61.94 and at such other times as may be required by the Administrator under Section 114 of the Act, the owner or operator of each source shall furnish the Administrator a written report of the measurements of benzene made by the continuous monitoring system during the emission test within 60 days.

(f) All continuous monitoring systems used in accordance with this section are to complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

(g) Owners or operators of all continuous monitoring systems installed in accordance with this subpart shall check the zero and span drift at least once daily in accordance with the method prescribed by the manufacturer of such systems unless the manufacturer of such systems recommends adjustments at shorter intervals, in which case such recommendations shall be followed. The daily span check is to be conducted with reference gas containing a concentration of benzene determined to be equivalent to the emission limit for that source based on the emission tests required by § 61.94.

(h) The calibration is to be done with either—

(1) A calibration mixture prepared from the liquids and gases specified in Section 5.2.1 and 5.2.2 of Test Method 110 and in accordance with Section 7.1 of Test Method 110; or

(2) A calibration gas cylinder standard containing the appropriate concentration of benzene. The gas composition of the calibration gas cylinder standard is to have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so gas standards will not be used if their concentration has changed greater than ±5 percent from the certified value. The data of gas cylinder preparation, certified benzene concentration, and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the continuous monitoring system, these gas mixtures may be used directly to prepare a chromatograph calibration curve as described in Section 7.2 of Test Method 110 for certification of cylinder standards and for establishment and verification of calibration standards.

(i) After receipt and consideration of written application, the Administrator may approve use of an alternative or equivalent continuous monitoring system, alternative monitoring procedures, or alternative monitoring requirements.

(Sec. 114, Clean Air Act as amended [42 U.S.C. 7414])

§ 61.96 Recordkeeping requirements.

(a) The owner or operator of each source to which this subpart applies shall maintain daily records of the monitoring information specified in § 61.95(a).

(b) Records are to be retained at the source and made available for inspection by the Administrator for a minimum of 2 years.

(Sec. 114, Clean Air Act as amended [42 U.S.C. 7414])

Appendix B—Test Methods

Method 110. Determination of Benzene From Stationary Sources

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamilar with source sampling, because knowledge beyond the scope of this presentation is required. Care must be exercised to prevent exposure of sampling personnel to benzene, a carcinogen.

1. Applicability and Prinicple

1.1 Applicability. This method applies to the measurement of benzene in stack gases from processes as specified in the regulations. The method does not remove benzene contained in particulate matter.

1.2 Principle. An integrated bag sample of stack gas containing benzene and other organics is subjected to gas chromatographic (GC) analysis, using a flame ionization detector (FID).

2. Range and Sensitivity

The range of this method is 0.1 to 70 ppm. The upper limit may be extended by extending the calibration range or by diluting the sample.

3. Interferences

The chromatograph columns and the corresponding operating parameters herein described normally provide an adequate resolution of benzene; however, resolution interferences may be encountered on some sources. Therefore, the chromatograph operator shall select the column and operating parameters best suited to his particular analysis problem, subject to the approval of the Administrator. Approval is automatic provided that the tester produces confirming data through an adequate supplemental analytical technique, such as analysis with a different column or GC/mass spectroscopy, and has the data available for review by the Administrator.

4. Apparatus

4.1 Sampling (see Figure 110–1). The sampling train consists of the following components:

4.1.1 Probe. Stainless steel, Pyrex * glass, or Teflon tubing (as stack temperature permits), equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample Lines. Teflon, 6.4 mm outside diameter, of sufficient length to connect probe to bag. Use a new unused piece for each series of bag samples that constitutes an emission test and discard upon completion of the test.

4.1.3 Quick Connects. Stainless steel, male (2) and female (2), with ball checks (one pair without) located as shown in figure 110–1.

4.1.4 Tedlar or aluminized Mylar bags, 100 L capacity, to contain sample.

4.1.5 Bag Containers. Rigid leakproof containers for sample bags with covering to protect contents from sunlight.

4.1.6 Needle Valve. To adjust sample flow rate.

4.1.7 Pump. Leak-free with minimum of 2 L/min capacity.

4.1.8 Charcoal Tube. To prevent admission of benzene and other organics to the atmosphere in the vicinity of samplers.

4.1.9 Flow Meter. For observing sample flow rate; capable of measuring a flow range from 0.10 to L/min.

4.1.10 Connecting Tubing. Teflon, 6.4 mm outside diameter, to assemble sampling train (Figure 110–1.)

4.2 Sample Recovery. Teflon tubing, 6.4 mm outside diameter, is required to connect chromatograph sample loop for sample recovery. Use a new unused piece for each series of bag samples that constitutes an emission test and discard upon conclusion of analysis of those bags.

4.3 Analysis. The following equipment is needed:

4.3.1 Gas Chromatograph. With FID, potentiometric strip chart recorder and 1.0 to 2.0 mL sampling loop in automatic sample valve. The chromatographic system shall be capable of producing a response to 0.1ppm benzene that is at least as great as the average noise level. (Response is measured from the average value of the base line to the maximum of the waveform, while standard operating conditions are in use.)

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* Mention of trade names or specific products does not constitute endorsement by the U.S. Environmental Protection Agency.

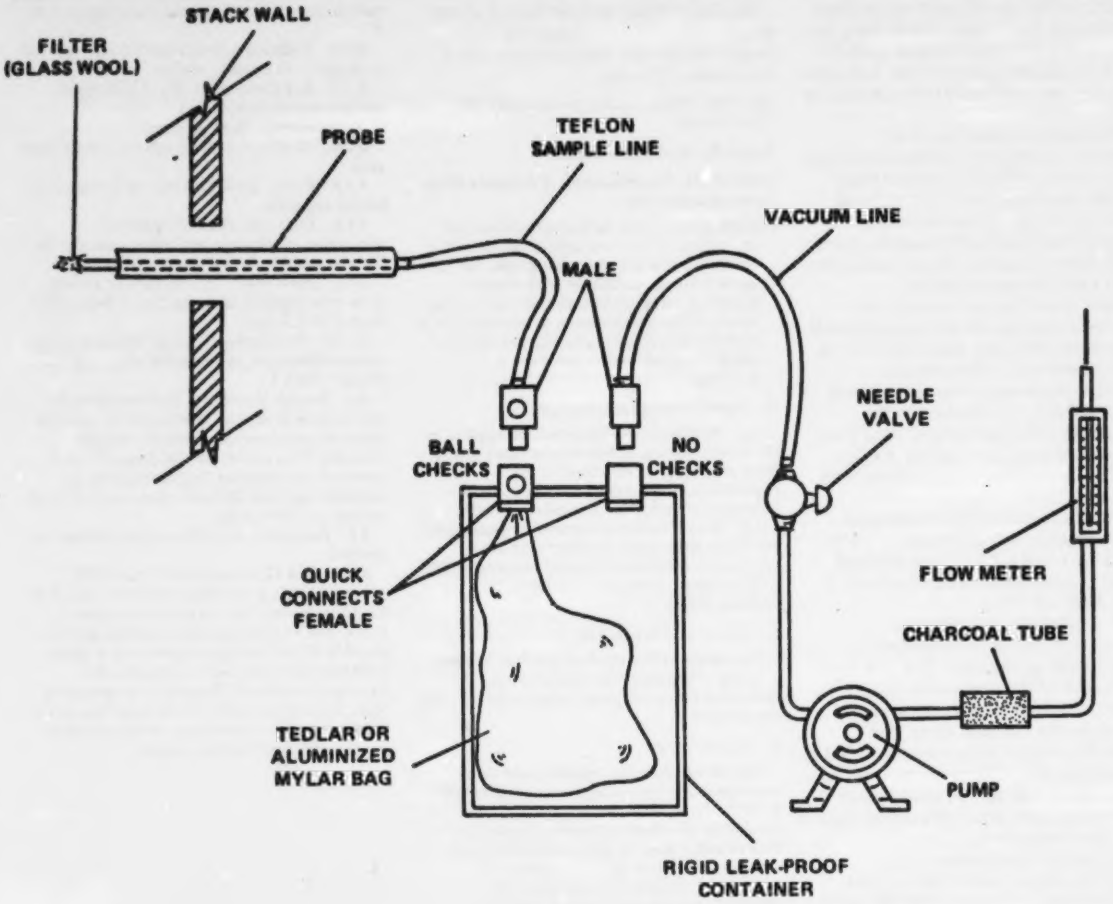
STACK WALL
FILTER (GLASS WOOL)
PROBE
TEFLON SAMPLE LINE
VACUUM LINE
MALE
NEEDLE VALVE
BALL CHECKS
NO CHECKS
QUICK CONNECTS FEMALE
FLOW METER
CHARCOAL TUBE
TEDLAR OR ALUMINIZED MYLAR BAG
PUMP
RIGID LEAK-PROOF CONTAINER

Figure 110-1. Integrated-bag sampling train. (Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.)

4.3.2 Chromatographic Columns. Columns as listed below. The analyst may use other columns provided that the precision and accuracy of the analysis of benzene standards are not impaired and he has available for review information confirming that there is adequate resolution of the benzene peak. (Adequate resolution is defined as an area overlap of not more than 10 percent of the benzene peak by an interferent peak. Calculation of area overlap is explained in Appendix E, Supplement A: "Determination of Adequate Chromatographic Peak Resolution.")

4.3.2.1 Column A: Benzene in the Presence of Aliphatics. Stainless steel, 2.44 m by 3.2 mm, containing 10 percent 1,2,3-tris (2-cyanoethoxy) propane (TCEP) on 80/100 Chromosorb P AW.

4.3.2.2 Column B: Benzene With Separation of the Isomers of Xylene. Stainless steel, 1.83 m by 3.2 mm, containing 5 percent SP 1,200/1.75 percent Bentone 34 on 100/120 Suplecoport.

4.3.3 Flow Meters (2). Rotameter type, 100 mL/min capacity.

4.3.4 Gas Regulators. For required gas cylinders.

4.3.5 Thermometer. Accurate to 1° C, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer. Accurate to 5 mmHg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump. Leak-free, with minimum of 100 mL/min capacity.

4.3.8 Recorder. Strip chart type, optionally equipped with either disc or electronic integrator.

4.3.9 Planimeter. Optional, in place of disc or electronic integrator, on recorder, to measure chromatograph peak areas.

4.4 Calibration. Sections 4.4.2 through 4.4.5 are for the optional procedure in Section 7.1.

4.4.1 Tubing. Teflon, 6.4 mm outside diameter, separate pieces marked for each calibration consentration.

4.4.2 Tedlar or Aluminized Mylar Bags. 50 L capacity, with valve; separate bag marked for each calibration concentration.

4.4.3 Syringes. 1.0 μL and 10 μL, gas tight, individually calibrated to dispense liquid benzene.

4.4.4 Dry Gas Meter, With Temperature and Pressure Gauges. Accurate to ±2 percent, to meter nitrogen in preparation of standard gas mixtures, calibrated at the flow rate used to prepare standards.

4.4.5 Midget Impinger/Hot Plate Assembly. To vaporize benzene.

5. Reagents

Use only reagents that are of chromatographic grade.

5.1 Analysis. The following are needed for analysis:

5.1.1 Helium or Nitrogen. Zero grade, for chromatograph carrier gas.

5.1.2 Hydrogen. Zero grade.

5.1.3 Oxygen or Air. Zero grade, as required by the detector.

5.2 Calibration. Use one of the following options: either 1.2.1 and 5.2.2, or 5.2.3.

5.2.1 Benzene, 99 Mol Percent Pure. Certified by the manufacturer to contain a minimum of 99 Mol percent benzene; for use in the preparation of standard gas mixtures as described in Section 7.1.

5.2.2 Nitrogen. Zero grade, for preparation of standard gas mixtures as described in Section 7.1.

5.2.3 Cylinder Standards (3). Gas mixture standards (50, 10, and 5 ppm benzene in nitrogen cylinders). The tester may use cylinder standards to directly prepare a chromatograph calibration curve as described in Section 7.2.2, if the following conditions are met: (a) The manufacturer certifies the gas composition with an accuracy of ±3 percent or better (see Section 5.2.3.1). (b) The manufacturer recommends a maximum shelf life over which the gas concentration does not change by greater than ±5 percent from the certified value. (c) The manufacturer affixes the date of gas cylinder preparation, certified benzene concentration, and recommended maximum shelf life to the cylinder before shipment to the buyer.

5.2.3.1 Cylinder Standards Certification. The manufacturer shall certify the concentration of benzene in nitrogen in each cylinder by (a) directly analyzing each cylinder and (b) calibrating his analytical procedure on the day of cylinder analysis. To calibrate his analytical procedure, the manufacturer shall use, as a minimum, a three-point calibration curve. It is recommended that the manufacturer maintain (1) a high-concentration calibration standard (between 50 and 100 ppm) to prepare his calibration curve by an appropriate dilution technique; and (2) a low-concentration calibration standard (between 5 and 10 ppm) to verify the dilution technique used. If the difference between the apparent concentration read from the calibration curve and the true concentration assigned to the low-concentration standard exceeds 5 percent of the true concentration, the manufacturer shall determine the source of error and correct it, then repeat the three-point calibration.

5.2.3.2 Verification of Manufacturer's Calibration Standards. Before using, the manufacturer shall verify each calibration standard by (a) comparing it to gas mixtures prepared (with 99 Mol percent benzene) in accordance with the procedure described in Section 7.1 or by (b) having it analyzed by the National Bureau of Standards. The agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent. The manufacturer must reverify all calibration standards on a time interval consistent with the shelf life of the cylinder standards sold.

5.2.4 Audit Cylinder Standards (2). Gas mixture standards with concentrations known only to the person supervising the analysis of samples. The audit cylinder standards shall be identically prepared as those in Section 5.2.3 (benzene in nitrogen cylinders). The concentrations of the audit cylinder should be: one low-concentration cylinder in the range of 5 to 20 ppm benzene and one high-concentration cylinder in the range of 100 to 300 ppm benzene. When available, the tester may obtain audit cylinders by contacting: U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Quality Assurance Branch (MD -77), research Triangle Park, North Carolina 27711. If audit cylinders are not available at the Environmental Protection Agency, the tester must secure an alternative source.

6. Procedure

6.1 Sampling. Assemble the sample train as shown in Figure 110-1. Perform a bag leak check according to Section 7.3.2. Join the quick connects as illustrated, and determine that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack, and start the pump with the needle valve adjusted to yield a flow that will more than half fill the bag in the specified sample period. After allowing sufficient time to purge the line several times, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. At all times, direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vacuum line from the bag container. Protect the bag container from sunlight.

6.2 Sample Storage. Keep the sample bags out of direct sunlight. Perform the analysis within 4 days of sample collection.

6.3 Sample Recovery. With a new piece of Teflon tubing identified for that bag, connect a bag inlet valve to the gas chromatograph sample valve. Switch the valve to receive gas from the bag through the sample loop. Arrange the equipment so the sample gas passes from the sample valve to a 100-mL/min rotameter with flow control valve followed by a charcoal tube and a 1-in. pressure gauge. The tester may maintain the sample flow either by a vacuum pump or container pressurization if the collection bag remains in the rigid container. After sample loop purging is ceased, always allow the pressure gauge to return to zero before activating the gas sampling valve.

6.4 Analysis. Set the column temperature to 80° C (176° F) for column A or 75° C (167° F) for column B, and the detector temperature to 225° C (437° F). When optimum hydrogen and oxygen flow rates have been determined, verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 20 mL/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base-line drift has ceased. Purge the sample loop for 30 sec at the rate of 100 mL/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), the sample number, the sample loop temperature, the column temperature, carrier gas flow rate, chart speed, and the attenuator setting. From the chart, note the peak having the retention time corresponding to benzene, as determined in Section 7.2.1. Measure the benzene peak area, A_m, by use of a disc integrator, electronic integrator, or a planimeter. Record A_m and the retention time. Repeat the injection at least two times or until two consecutive values for the total area of the benzene peak do not vary more than 5 percent. Use the average value of these two total areas to compute the bag concentration.

6.5 Determination of Bag Water Vapor Content. Measure the ambient temperature and barometric pressure near the bag. From a water saturation vapor pressure table, determine and record the water vapor content of the bag as a decimal figure. (Assume the relative humidity to be 100 percent unless a lesser value is known.)

7. *Preparation of Standard Gas Mixtures, Calibration, and Quality Assurance*

7.1 Preparation of Benzene Standard Gas Mixtures. (Optional procedure—delete if cylinder standards are used.) Assemble the apparatus shown in Figure 110–2. Evacuate a 50-L Tedlar or aluminized Mylar bag that has passed a leak check (described in Section 7.2.2) and meter in about 50 L of nitrogen. Measure the barometric pressure, the relative pressure at the dry gas meter, and the temperature at the dry gas meter. While the bag is filling, use the 10μL syringe to inject 10μL of 99+ percent benzene through the septum on top of the impinger. This gives a concentration of approximately 50 ppm of benzene. In a like manner, use the other syringe to prepare dilutions having approximately 10 ppm and 5 ppm benzene concentrations. To calculate the specific concentrations, refer to Section 8.1. These gas mixture standards may be used for 7 days from the date of preparation, after which time preparation of new gas mixtures is required. (Caution: If the new gas mixture standard is a lower concentration than the previous gas mixture standard, contamination may be a problem when a bag is reused.)

7.2 Calibration.

7.2.1 Determination of Benzene Retention Time. (This section can be performed simultaneously with Section 7.2.2.) Establish chromatograph conditions identical with those in Section 6.4, above. Determine proper attenuator position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, the sample loop temperature, the column temperature, the carrier gas flow rate, the chart speed, and the attenuator setting. Record peaks and detector responses that occur in the absence of benzene. Maintain conditions, with the equipment plumbing arranged identically to Section 6.3, and flush the sample loop for 30 sec at the rate of 100 mL/min with one of the benzene calibration mixtures. Then activate the sample valve. Record the injection time. Select the peak that corresponds to benzene. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This distance divided by the chart speed is defined as the benzene peak retention time. Since it is quite likely that there will be other organics present in the sample, it is very important that positive identification of the benzene peak be made.

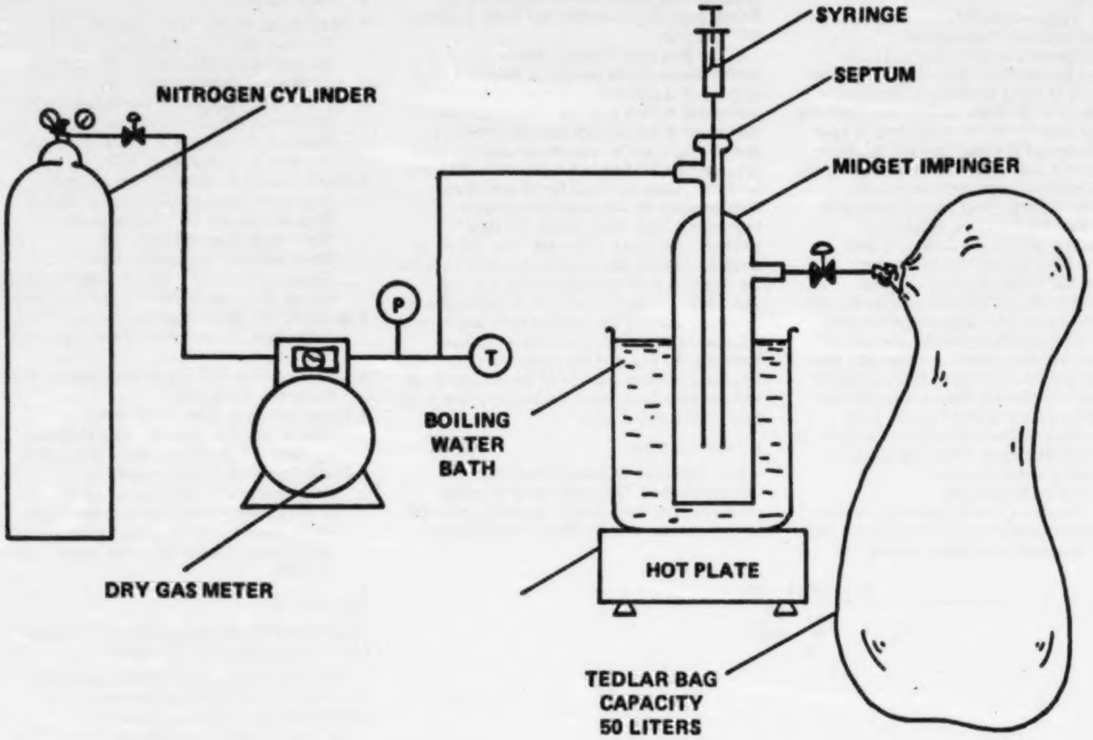
SYRINGE
SEPTUM
NITROGEN CYLINDER
MIDGET IMPINGER
P
T
BOILING
WATER
BATH
HOT PLATE
DRY GAS METER
TEDLAR BAG
CAPACITY
50 LITERS

Figure 110-2. Preparation of benzene standards (optional).

Question.

7.2.2 Preparation of Chromatograph Calibration Curve. Make a gas chromatographic measurement of each standard gas mixture (described in Section 5.2.3 or 7.1.1) using conditions identical with those listed in Sections 6.3 and 6.4. Flush the sampling loop for 30 sec at the rate of mL/min with one of the standard gas mixtures and activate the sampe valve. Record C_c, the concentration of benzene injected, the attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the laboratory pressure. Calculate A_c, the peak area multiplied by the attenuator setting. Repeat until two consecutive injection areas are within 5 percent, then plot the average of those two values versus C_c. When the other standard gas mixtures have been similarly analyzed and plotted, draw a straight line through the points derived by the least squares method. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.3 Quality Assurance.

7.3.1 Analysis Audit. Immediately after the preparation of the calibration curve and before the sample analyses, perform the analysis audit described in Appendix E, Supplement B: "Procedure for Field Auditing GC Analysis."

7.3.2 Bag Leak Checks. While performance of this section is required after bag use, it is also advised that it be performed before bag use. After each use, make sure a bag did not develop leaks by connecting a water manometer and pressurizing the bag to 5 to 10 cm H_2O (2 to 4 in. H_2O). Allow to stand for 10 min. Any displacement in the water manometer indicates a leak. Also, check the rigid container for leaks in this manner. (Note: an alternative leak check method is to pressurize the bag to 5 to 10 cm H_2O or 2 to 4 in. H_2O and allow to stand overnight. A deflated bag indicates a leak.) For each sample bag in its rigid container, place a rotameter in line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. Calculations

8.1 Optional Benzene Standards Concentrations. Calculate each benzene standard concentration (C_c in ppm) prepared in accordance with Section 7.1 as follows:

$$C_c = \frac{B(0.2706)(10^3)}{V_m \; Y \; \frac{293}{T_m} \; \frac{P_m}{760}}$$

$$C_c = 701.9 \frac{B T_m}{V_m \, Y \, P_m} \qquad (110\text{-}1)$$

where:

B = Volume of benzene injected, microliters.

V_m = Gas volume measured by dry gas meter, liters.

Y = Dry gas meter calibration factor, dimensionless.

P_m = Absolute pressure of the dry gas meter, mmHg.

T_m = Absolute temperature of the dry gas meter, °K.

0.2706 = Ideal gas volume of benzene at 293° K and 760 mmHg L/mL.

10^3 = Conversion factor [(ppm)(mL)/μL].

8.2 Benzene Sample Concentrations. From the calibration curve described in Section 7.2.2 above, select the value of C_c that corresponds to A_c. Calculate the concentration of benzene in the sample (C_s in ppm) as follows:

$$C_s = \frac{C_c P_r T_i}{P_i T_r (1 - S_{wb})}, \qquad (110\text{-}2)$$

where:

C_s = Concentration of benzene in the sample, ppm.

C_c = Concentration of benzene indicated by the gas chromatograph, ppm.

P_r = Reference pressure, the barometric pressure recorded during calibration, mmHg.

T_i = Sample loop temperature at the time of analysis, °K.

P_i = Barometric pressure at time of analysis, mmHg.

Tr = Reference temperature, the sample loop temperature recorded during calibration, °K.

S_{wb} = Water vapor content of the bag sample, volume fraction.

9. References

1. Feairheller, W. R., A. M. Kemmer, B. J. Warner, and D. Q. Douglas. Measurement of Gaseous Organic Compound Emissions by Gas Chromatography. U.S. Environemental Protection Agency. EPA Contract Number 68-02-1404. January 1978. Revised by EPA August 1978.
2. Knoll, Joseph E., Wade H. Penny, and Rodney M. Midgett. The Use of Tedlar Bags to Contain Gaseous Benzene Samples at Source Level. U.S. Environmental Protection Agency. Research Triangle Park, N.C. Monitoring Series, EPA-600/4-78-057. October 1978.
3. Supelco, Inc. Separation of Hydrocarbons. Bellefonte, Pa. Bulletins 743A, 740C, and 740D. 1974.
4. Current Peaks. *10*:1. Carle Instruments, Inc. Fullerton, Calif. 1977.
5. Knoll, Joseph E. Communications Concerning Chromatographic Columns for Benzene Analysis. October 18, 1977.
6. Knoll, Joseph E. Communications Concerning Gas Chromatographic Columns for Separating Benzene From Other Organics in Cumene and Maleic Anhydride Process Effluents. November 10, 1977.

Appendix C

Supplement A—Determination of Adequate Chromatographic Peak Resolution

In this method of dealing with resoultion, the extent to which one chromatographic peak overlaps another is determined.

For convenience, consider the range of the elution curve of each compound as running from -2σ to $+2\sigma$. This range is used in other resolution criteria, and it contains 95.45 percent of the area of a normal curve. If two peaks are separated by a known distance, b, one can determine the fraction of the area of one curve that lies within the range of the other. The extent to which the elution curve of a contaminant compound overlaps the curve of a compound that is under analysis is found by integrating the contaminant curve over limits $b-2\sigma_s$ to $b+2\sigma_s$, where σ_s is the standard deviation of the sample curve.

There are several ways this calculation can be simplified. Overlap can be determined for curves of unit area; then actual areas can be introduced. The desired integration can be resolved into two integrals of the normal distribution function for which there are convenient calcualtion programs and tables. An example would be Program 15 in Texas Instruments Program Manual ST1, 1975, Texas Instruments, Inc., Dallas, Texas 75222.

$$\frac{1}{\sqrt{2\pi}\,\sigma c}\int_{b-2\sigma_s}^{b+2\sigma_s} e^{-\frac{t_c^2}{2\sigma_c}}\,dt = \frac{1}{\sqrt{2\pi}}\int_{\frac{b-2\sigma_s}{\sigma_c}}^{\infty} e^{-\frac{x^2}{2}}\,dx - \frac{1}{\sqrt{2\pi}}\int_{\frac{b+2\sigma_s}{\sigma_c}}^{\infty} e^{-\frac{x^2}{2}}\,dx.$$

The following calculation steps are required:*

1. $2\sigma_s = t_s/\sqrt{2 \ln 2}$
2. $\sigma_c = t_c/2\sqrt{2 \ln 2}$
3. $x_1 = (b-2\sigma_s)/\sigma_c$
4. $x_2 = (b+2\sigma_s)/\sigma_c$
5. $Q(x_1) = \frac{1}{\sqrt{2\pi}}\int_{x_1}^{\infty} e^{-\frac{x^2}{2}}\,dx$
6. $Q(x_2) = \frac{1}{\sqrt{2\pi}}\int_{x_2}^{\infty} e^{-\frac{x^2}{2}}\,dx$
7. $I_0 = Q(x_1) - Q(x_2)$
8. $A_0 = I_0 A_c/A_s$
9. Percentage overlap = $A_0 \times 100$

where

A_s = The area of the sample peak of interest determined by electronic integration, or by the formula $A_s = h_s t_s$.
A_c = The area of the contaminant peak, determined in the same manner as A_s.
b = The distance on the chromatographic chart that separates the maxima of the two peaks.
H_s = The peak height of the sample compound of interest, measured from the average value of the baseline to the maximum of the curve.
t_s = The width of the sample peak of interest at 1/2 of peak height.
t_c = The width of the contaminant peak at 1/2 of peak height.
σ_s = The standard deviation of the sample compound of interest elution curve.
σ_c = The standard deviation of the contaminant elution curve.
$Q(x_1)$ = The integral of the normal distribution function from x_1 to infinity.
$Q(x_2)$ = The integral of the normal distribution function from x_2 to infinity.
I_0 = The overlap integral.
A_0 = The area overlap fraction.

In judging the suitability of alternate gas chromatographic columns, or the effects of altering chromatographic conditions, one can employ the area overlap as the resolution parameter with a specific maximum permissible value.

The use of Gaussian functions to describe chromatographic elution curves is widespread. However, some elution curves are highly asymmetric. In those cases where the sample peak is followed by a contaiminant that has a leading edge that rises sharply but the curve then tails off, it may be possible to define an effective width for t_c as "twice the distance from the leading edge to a perpendicular line through the maxim of the contaminant curve, measured along a perpendicular bisection of that line."

Supplement B—Procedure for Field Auditing GC Analysis

Responsibilities of audit supervisor and analyst at the source sampling site include the following:

A. Check that audit cylinders are stored in a safe location both before and after the audit to prevent vandalism of same.

B. At the beginning and conclusion of the audit, record each cylinder number and cylinder pressure. Never analyze an audit cylinder when the pressure drops below 200 psi.

C. During the audit, the analyst is to perform a minimum of two consecutive analyses of each audit cylinder gas. The audit must be conducted to coincide with the analysis of source test samples. Normally, it will be conducted immediately after the GC calibration and prior to the sample analyses.

D. At the end of audit analyses, the audit supervisor requests the calculated concentrations from the analyst and then compares the results with the actual audit concentrations. If each measured concentration agrees with the respective actual concentration within ±10 percent, he then directs the analyst to begin the analysis of source samples. Audit supervisor judgment and/or supervisory policy determine course of action with agreement is not within ±10 percent. Where a consistent bias in excess of 10 percent is found, it may be possible to proceed with the sample analyses, with a corrective factor to be applied to the results at a later time. However, every attempt should be made to locate the cause of the discrepancy, as it may be misleading. The audit supervisor is to record each cylinder number, cylinder pressure (at the end of the audit), and all calculated concentrations. The individual being audited must not under any circumstance be told the actual audit concentrations until the calculated concentrations have been submitted to the audit supervisor.

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*In most instances, $Q(x_2)$ is very small and may be neglected.

FIELD AUDIT REPORT

PART A - To be filled out by organization supplying audit cylinders

1. Organization supplying audit sample(s) and shipping address ____________

2. Audit supervisor, organization, and phone number ____________

3. Shipping instructions: Name, Address, Attention ____________

4. Guaranteed arrival date for cylinders ____________
5. Planned shipping date for cylinders ____________
6. Details on audit cylinders from last analysis

	Low Conc.	High Conc.
a. Date of last analysis		
b. Cylinder number		
c. Cylinder pressure, psi		
d. Audit gas(es)/balance gas		
e. Audit gas(es) ppm		
f. Cylinder construction		

PART B - To be filled out by audit supervisor

1. Process sampled ____________
2. Location of audit ____________
3. Name of individual audited ____________
4. Audit date ____________
5. Audit results

	Low Conc. Cylinder	High Conc. Cylinder
a. Cylinder number		
b. Cylinder pressure before audit, psi		
c. Cylinder pressure after audit, psi		
d. Measured concentration, ppm		
Injection #1*		
Injection #2*		
Average*		
e. Actual audit concentration, ppm (Part A, 6e)		
f. Audit accuracy*		
Low Conc. Cylinder		
High Conc. Cylinder		

*Percent accuracy = $\frac{\text{Measured Conc.} - \text{Actual Conc.}}{\text{Actual Conc.}} \times 100$

g. Problems detected (if any) ____________

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*Results of two consecutive injections that meet the sample analysis criteria of the test method.

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1498-2; Docket No. OAQPS 79-3]

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Maleic Anhydride Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amended Notice of Public Hearing and Extension of Public Comment Period.

SUMMARY: On April 18, 1980, EPA proposed in the Federal Register (45 FR 26660) a national emission standard for benzene emissions from maleic anhydride plants.

In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards, the health effects of benzene, and the listing of benzene as a hazardous air pollutant. This notice amends the date and location of the public hearing and extends the public comment period.

DATES: Written comments to be included in the record should be postmarked no later than August 21, 1980. Notice of intent to present oral testimony at the public hearing should be postmarked no later than July 15, 1980. The hearing will be held in Washington, D.C., on July 22, 1980. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be submitted no later than August 21, 1980.

ADDRESSES: Comments on the health effects of benzene and the listing of benzene as a hazardous air pollutant should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number OAQPS 79-3, Part I, U.S. Environmental Protection Agency, 401 M Street S.W., Washington, D.C. 20460. Comments on the proposed maleic anhydride standard should be submitted to: Central Docket Section (A-130), Attention: Docket No. OAQPS 79-3, Part II, same address.

The public hearing will be held at the General Services Administration Auditorium; 7th and D Streets, S.W., Washington, D.C. beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

FOR FURTHER INFORMATION CONTACT: Susan R. Wyatt, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: The public hearing has been postponed and the public comment period has been extended in response to requests from the American Petroleum Institute and Dow Chemical USA. These requests expressed the need to review more completely the large amount of information that has been and is being developed on benzene health effects, to inspect the docket before the public hearing, and to prepare testimony and written comments on the associated technological and policy related issues.

Dated: May 16, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 80-15717 Filed 5-21-80; 8:45 am]

40 CFR Part 61

[FRL 1545-8, Docket No. OAQPS 79-3]

National Emission Standards for Hazardous Air Pollutants; Emissions From Maleic Anhydride Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amended notice of public hearing and extension of public comment period.

SUMMARY: The public hearing has been postponed and the public comment period for listing of benzene as a hazardous air pollutant, the proposed standard, and Test Method 110, has been extended in response to a request from the American Petroleum Institute. This request expressed the need to review more completely the large amount of information that has been and is being developed on benzene health effects, to inspect the docket before the public hearing, and to prepare testimony and written comments on the associated technological and policy related issues. The comment period for Appendix C remains the same and there will be no public hearing on Appendix C.

DATES: Written comments on the listing of benzene as a hazardous air pollutant, the proposed standard and Test Method 110 to be included in the record should be postmarked no later than September 22, 1980. Notice of intent to present oral testimony at the public hearing should be postmarked no later than August 14, 1980. The hearing will be held in Washington, D.C. on August 21, 1980. Written comments responding to, supplementing, or rebuttal written or oral comments received at the public hearing must be submitted no later than September 22, 1980. Written comments on Appendix C to be included in the record should be postmarked no later than August 22, 1980.

ADDRESSES: Comments on the health effects of benezene and the listing of benzene as a hazardous air pollutant should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention; Docket Number OAQPS 79-3, Part I, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. Comments on the proposed maleic anhydride standard, Test Method 110, and Appendix C should be submitted to: Central Docket Section (A-130), Attention: Docket No. OAQPS 79-3, Part II, same address.

The public hearing will be held at the General Services Administration Auditorium: 7th and D Streets, S.W., Washington, D.C. beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone number (919) 541-5477.

FOR FURTHER INFORMATION CONTACT: Susan R. Wyatt, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: On April 18, 1980, EPA proposed in the **Federal Register** (45 FR 26660) a national emission standard for benzene emissions from maleic anhydride plants, Test Method 110 for measuring benzene emissions, and Appendix C containing Supplement A for Determination of Adequate Chromatographic Peak Resolution and Supplement B, a **Procedure for Field Auditing GC Analysis.**

On May 22, 1980, EPA published in the **Federal Register** (45 FR 34315) an amended notice of public hearing and extension of public comment period for the listing of benzene as a hazardous air pollutant, the proposed standard, Test Method 110, and Appendix C.

In the amended notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the listing of benzene as a hazardous air pollutant, the proposed standard, Test Method 110 and Appendix C. This notice amends the date of the public hearing and extends the public comment period for the listing of benzene as a hazardous air pollutant, the proposed standard, and Test Method 110, but not Appendix C. Appendix C contains two supplements which are referenced in Test Method 110. Supplement A is for "Determination of Adequate Chromatographic Peak Resolution" and Supplement B is a "Procedure for Field Auditing Gas Chromatographic Analysis." These supplements are scheduled to be referenced in other testing methods and standards. Because these supplements are separable from the proposed maleic anhydride standard, they are to be used for other purposes, and the substance of the final maleic anhydride standard will be unaffected by these supplements, it is not necessary or desirable to delay the public comment period on them. Also because of the nature of the technical detail in these supplements, a public hearing on them is not necessary.

Dated: June 16, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 80-22383 Filed 7-23-80; 8:45 am]

40 CFR Part 61

[FRL 1617-8 Docket No. OAQPS 79-3]

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Maleic Anhydride Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extension of public comment period.

SUMMARY: The public comment period for listing of benzene as a hazardous air pollutant, the proposed standard, and Test Method 110, has been extended 45 days in response to a request from the American Petroleum Institute. This request expressed the need to review more completely the comments received and the testimony presented at the August 21, 1980, public hearing.

DATES: Written comments to be included in the record on the listing of benzene as a hazardous air pollutant, the proposed standard and Test Method 110 and written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than November 6, 1980.

ADDRESSES: Comments on the health effects of benzene and the listing of benzene as a hazardous air pollutant should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention Docket Number OAQPS 79-3, Part I, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460. Comments on the proposed maleic anhydride standard and Test Method 110 should be submitted to: Central Docket Section (A-130), Attention: Docket No. OAQPS 73-3, Part II, same address.

FOR FURTHER INFORMATION CONTACT: Susan R. Wyatt, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: On April 18, 1980, EPA proposed in the **Federal Register** (45 FR 26660) a national emission standard for benzene emissions from maleic anhydride plants, Test Method 110 for measuring benzene emissions, and Appendix C containing Supplement A for "Determination of Adequate Chromatographic Peak Resolution" and Supplement B, a "Procedure for Field Auditing GC Analysis."

On May 22, 1980, EPA published in the **Federal Register** (45 FR 34315) an amended notice of public hearing and extension of public comment period for the listing of benzene as a hazardous air pollutant, the proposed standard, Test Method 110, and Appendix C. In the amended notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the listing of benzene as a hazardous air pollutant, the proposed standard, Test Method 110, and Appendix C.

On July 24, 1980, EPA published in the **Federal Register** (45 FR 49298) another amended notice of public hearing and extension of public comment period for the listing of benzene as a hazardous air pollutant, the proposed standard, and Test Method 110. In this amended notice, EPA announced the revised date ending the public comment period and the revised date of the public hearing to receive public comment on the listing of benzene as a hazardous air pollutant, the proposed standard, and Test Method 110. In addition, this notice announced the separation of Appendix C, containing Supplement A for "Determination of Adequate Chromatographic Peak Resolution" and Supplement B, "Procedure for Field Auditing Gas Chromatographic Analysis," from the rest of the original proposal, and that the public comment period for Appendix C would remain unchanged from the May 22, 1980, **Federal Register** notice.

Today's notice extends the public comment period for the listing of benzene as a hazardous air pollutant, the proposed standard, and Test Method 110.

Dated: September 23, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 80-[illegible] Filed 9-26-80; 8:45 am]

ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

BENZENE EMISSIONS FROM ETHYLBENZENE/STYRENE PLANTS

SUBPART I

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL 1551-6]

National Emissions Standards For Hazardous Air Pollutants; Benzene Emissions From Ethylbenzene/Styrene Plants; Public Hearing

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: The proposed standard would limit benzene emissions from process vents at existing and new ethylbenzene and styrene (EB/S) plants to five parts per million by volume (ppmv) on a dry basis corrected to three percent oxygen. Emissions in excess of this numerical emissions limit would be allowed only during malfunctions, startup, and shutdown. During these times, however, these emissions would have to be flared.

The proposed standard implements the Clean Air Act and is based on the Administrator's determination on June 8, 1977, that benzene presents a significant carcinogenic risk to human health as a result of emissions from one or more stationary source categories and is therefore a hazardous air pollutant (42 FR 29332). The intent of the standard is to protect the public health with an ample margin of safety.

A public hearing will be held to provide interested persons the opportunity for oral presentation of data, views, or arguments concerning the proposed standard for EB/S plants.

DATES: *Comments.* Comments must be received on or before March 7, 1981.

Public Hearing. A public hearing will be held on February 5, 1981 beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by January 29, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-49, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at the EPA Administration Bldg. Auditorium, Research Triangle Park, N.C. Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emissions Standards & Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5331.

Background Information Document. The Health Risk Assessment Documents for benzene and the Background Information Document (BID) for the proposed standard are contained in the docket and may be obtained from the U.S. EPA Library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Benzene Emissions from the Ethylbenzene/Styrene Industry—Background Information for Proposed standards," EPA-450/3-79-035a; "Assessment of Health Effects of Benzene Germane to Low Level Exposures," EPA-600/1-78-061; "Assessment of Human Exposures to Atmospheric Benzene," EPA-450/3-78-031; and "Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures," EPA-450/5-80-004.

Docket. Docket No. A-79-49, containing supporting information used in developing the proposed standard, is available for public inspection between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2902, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: Notice is given that, under the authority of section 112(b)(1)(B) of the Clean Air Act (as amended), the Administrator is proposing a national emission standard for benzene emissions from ethylbenzene/styrene plants. Although the proposed EPA "Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer" (44 FR 58642) proposed on October 10, 1979, are not final, the proposed standards for EB/S plants have been developed consistent with the proposed EPA policy and procedures. As prescribed in section 112(b)(1)(A) of the Act, the proposal of this standard was preceded by the Administrator's determination that benzene is a hazardous air pollutant as defined in section 112(a)(1) of the Act. Accordingly, the Administrator revised the list of hazardous air pollutants on June 8, 1977, by adding benzene (42 FR 29332).

A Background Information Document has been prepared that contains information on manufacturing and processing ethylbenzene and styrene; the available control technologies for benzene emissions; and analysis of the environmental, energy, economic, and inflationary impacts of regulatory options. Information on the health effects of benzene is contained in documents prepared by or for EPA, entitled the "Assessment of Health Effects of Benzene Germane to Low Level Exposure;" the "Assessment of Human Exposures to Atmospheric Benzene;" and the "Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures." Supplementary information on the regulation of benzene emissions can be obtained from the Maleic Anhydride Docket No. OAQPS-79-3 which is available for public review at EPA's Central Docket Section. The information contained in these documents is summarized in this preamble. All references used for the information contained in the preamble can be found in these five documents.

Proposed Standard

The proposed standard would limit the amount of benzene discharged to the atmosphere from each process vent stream or combination of process vent streams to five ppmv on a dry basis corrected to three percent oxygen. A process vent stream is defined as any continuous benzene-containing gas stream being released or having the potential of being released to the atmosphere from the alkylation reactor section, atmospheric and pressure columns, hydrogen separation system, or vacuum-producing devices.

The owner or operator of a source which uses a boiler [1] to control benzene emissions would have to monitory oxygen flow, firebox temperature, and compressor flow, and visually inspect process vents to determine if they are being routed to the control device. The owner or operator would have to report to the Administrator within ten days of each occurrence of emissions in excess of the numerical emissions limit (five ppmv) as determined by: (1) A three-hour average oxygen flow level below 1.5 percent by volume, (2) a three-hour average temperature more than 100°F below that measured during the emission test, (3) a three-hour period of no flow from the compressor, or (4) observation of process vent streams not being routed to the control device. The owner or operator of a source which uses a device other than a boiler to control benzene emissions would have to continuously monitor benzene concentrations and compressor flow, and report to the Administrator within ten days of each occurrence of emissions with concentrations greater than five ppmv or occurrences of no compressor flow.

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[1] The term "boiler" in this document includes process heaters and super-heaters.

Emissions in excess of the numerical emission limit (five ppmv) would be allowed during startup and shutdown of the entire source, alkylation reactor section, or dehydrogenation section. Emissions in excess of the numerical emission limit due to process or control equipment failure would be permitted only if the owner or operator of the source demonstrated to the Administrator's satisfaction that these emissions were unavoidable. Emissions in excess of five ppmv that could have been prevented by proper operation and maintenance would be considered avoidable, and therefore would be in violation of the proposed standard which requires that good air pollution control practice be followed. The proposed standard would require that emissions during periods of malfunction, startup, and shutdown be combusted with one or more smokeless flares, or be controlled by an equivalent means approved by the Administrator.

The format of the standard is comprised of two parts. Although continuous process emissions and emissions due to malfunction, startup, and shutdown originate from the same process unit, the control technologies for these emissions as outlined in the regulatory options differ. This is due primarily to flow characteristics and safety considerations inherent in each case.

Unless a waiver of compliance is obtained, each owner or operator would have to be in compliance within 90 days of the promulgation of the standard. A waiver of compliance can be granted by the Administrator for no more than two years from the promulgation date.

Summary of Health, Environmental, Energy, and Economic Impacts

The standard would apply to as many as 13 existing plants that produce ethylbenzene, styrene, or both. A recent analysis of the EB/S industry reveals that no new plants are expected to be constructed within the next five years primarily because the industry is not operating at full capacity.

The proposed standard would reduce total nationwide benzene emissions from all process vents within EB/S plants, based on current control and production at 100 percent capacity, from 2,100 megagrams per year (Mg/yr) to 91 Mg/yr. As a result of this reduction in continous process and excess process emissions, it is estimated that the nationwide incidence of leukemia deaths resulting from exposure to benzene emissions from EB/S process vents within 20 kilometers (km) of EB/S plants would be reduced from a range of 0.03 to 0.2 to a range of 1.3×10^{-4} to 9.2×10^{-4} deaths per year. In addition, a reduction in other health effects associated with benzene exposure (such as cytopenia, aplastic anemia, and chromosomal aberrations) may be expected.

The proposed standard would reduce the estimated maximum lifetime risk due to benzene emissions from EB/S process vents from a range of 6.2×10^{-4} to 4.4×10^{-3} to a range of 1.7×10^{-6} to 1.2×10^{-5}. The maximum lifetime risk represents the probability of someone dying of leukemia who has been exposed for a 70–year period to the highest maximum annual average benzene concentration due to benzene emissions from EB/S process vents.

The proposed standard would achieve the reduction in nationwide benzene emissions with minimal adverse impacts on other aspects of the environment. The other impacts that may occur primarily involve noise and thermal radiation associated with the use of flares for controlling excess emissions during startup, shutdown, or malfunction. Due to recovered energy, compliance with the proposed standard would result in a small energy savings, equivalent to approximately 0.1 percent of the current nationwide EB/S fuel requirements.

The capital investment required per plant to comply with the proposed standard would range from zero to $686,000, based on full capacity. The annualized costs per plant, assuming full capacity, would range from $68,750 to a savings of $140,000. The total nationwide capital cost of the proposed standard would be approximately $3.9 million based on production at 100 percent capacity. The total nationwide annualized cost, assuming full utilization of capacity, would be a net credit of $289,000 per year. The total annualized cost per Mg capacity of styrene would be a net credit of $0.07/Mg. These savings are due to a reduction in process energy requirements as a result of heat recovery from the combusted waste stream in the form of steam. The capital investment required per plant to comply with the proposed monitoring requirements, assuming no existing monitoring equipment, would be a maximum of $16,000 for installing two oxygen and temperature monitors and three flow meters, or $58,000 for installing a gas chromatograph and three flow meters. Finally, no plants are projected to close as a result of implementing the proposed standard.

Background Information on Health Effects of Benzene

The Administrator announced in the June 8, 1977, **Federal Register** (42 FR 29332) his decision to list benzene as a hazardous air pollutant under section 112 of the Clean Air Act. A hazardous pollutant is defined as an "* * * air pollutant to which no ambient air quality standard is applicable and which * * * may reasonably be anticipated to result in an increase in mortality or an increase in serious, irreversible, or incapacitating, reversible illness."

Numerous occupational studies conducted over the past 50 years have shown that health hazards result from prolonged inhalation exposure to benzene. Since 1900 the scientific and medical communities have recognized benzene as a toxic substance capable of causing acute and chronic effects. Benzene attacks the hematopoietic system, especially the bone marrow, and its toxicity is manifested primarily by alterations in the levels of the formed elements in the circulating blood (red cells, white cells, and platelets). The degree of severity ranges from mild and transient episodes to severe and fatal disorders. The mechanism by which benzene causes toxic effects is still unknown.

These adverse effects on the blood-forming tissues, including leukemia, have been documented in studies of workers in a variety of industries and occupations, including the manufacturing or processing of rubber, shoes, rotogravure, paints, chemicals, and, more recently, natural rubber cast film. These studies include single case reports, cross-sectional studies, and retrospective studies of morbidity and mortality among a defined group of workers industrially exposed to benzene.

Based on the entire set of these studies, the Administrator concluded that benzene exposure is causally related to a number of blood disorders, including leukemia (a cancer of the blood-forming system).[3] Although the studies which form the basis of this conclusion involve occupational exposure to benzene at higher levels than those found in the ambient air, the Administrator has "* * * made a generic determination that, in view of the existing state of scientific knowledge, prudent public health policy requires that carcinogens be considered for regulatoy purposes to pose some finite risk of cancer at any exposure level above zero" (44 FR 58646). Because of the widespread use of benzene, benzene emissions in the ambient air have been determined to result in significant human exposure. For these reasons, exposure to benzene emissions may reasonably be anticipated to result in one or more serious effects that can be expected to lead to an increase in mortality or an increase in serious, irreversible, or incapacitating, reversible illness. Therefore, the Administrator concluded that benzene satisfies the definition of a hazardous air pollutant under section 112 of the Clean Air Act.

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[3] Benzene also has been shown to be causally related to various cytopenias (decreaded levels of formed elements in the circulating blood), aplastic anemia (a non-functioning bone marrow), and potentially inheritable chromosomal aberrations.

Rationale for Regulating Ethylbenzene/Styrene Plants

Stationary source categories of benzene emissions include fugitive emissions form petroleum refineries and chemical manufacturing plants, the gasoline marketing system, process vents at several types of chemical manufacturing plants, coke by-product plants, and benzene storage and handling facilities. Ethylbenzene and styrene production are among the several types of chemical manufacturing plants which emit benzene. Ethylbenzene and styrene are considered jointly for regulation because the plants are located together and frequently physically integrated.

The first step in establishing a standard for benzene was to determine which of the source categories emitting benzene would be regulated. Although a pollutant such as benzene may be considered for regulation under section 112 of the Clean Air Act because emissions from a particular source category post a significant risk, other source categories may also emit the pollutant in lesser amounts. This may occur, for example, because the source categories process very little of the substance, because the substance is present in only trace amounts in the sources' raw materials, or because sources have installed adequate controls on their own initiative or in response to other regulatory requirements.

Approximately 17 percent of the benzene emissions from chemical manufacturing is from EB/S plants; they are the second largest source of benzene emissions in the chemical manufacturing industry. The largest source of benzene emissions in the chemical manufacturing industry is the production of maleic anhydride, which will be regulated under a separate standard.[3] Seventeen plants produce ethylbenzene, styrene, or both. Fifty percent of the benzene produced in the United States for chemical use goes to the production of ethylbenzene, styrene, or both. The current U.S. styrene capacity is 4.0 million Mg/yr (4.4 million tons/yr). The current U.S. ethylbenzene capacity is 4.7 million Mg/yr (5.2 million tons/yr). Benzene emissions from EB/S process vents currently are only controlled an average of 70 percent nationwide. Total benzene emissions from these sources currently are estimated to be about 2,100 Mg/yr.

Approximately 2.5 million people live within 20 km of the 13 EB/S plants that produce ethylbenzene by benzene alkylation and/or styrene by ethylbenzene dehydrogenation or ethylbenzene hydroperoxidation. This is considered the population at risk which is exposed to ambient concentrations of benzene due to benzene emissions from the process vents within these plants. As a result of exposure to these benzene concentrations, it was estimated that the maximum lifetime risk would be within a range of 6.2×10^{-4} to 4.4×10^{-3}. The maximum life time risk is defined here as the probability of an individual (within the assumed exposed population) dying of leukemia who is exposed continuously for 70 years to the highest maximum annual average ambient benzene concentration due to benzene emissions from EB/S process vents. In addition, it was estimated that there would be a range of 0.027 to 0.20 deaths per year within this population due to benzene exposure from EB/S process vents.

While the operating life of the plants (and, in fact, the long-range number of plants) which may be subject to this standard cannot be predicted with certainty, it has been estimated that the typical operating life of an ethylbenzene/styrene plant is 20 years. Individual plants may actually operate much longer than that. Existing plants which have been in operation for some time may have less than 20 years of remaining operating life. However, production of ethylbenzene and styrene began during World War II and there is no indication that production will cease in the foreseeable future. Therefore, it can be expected that if any existing capacity is shut down, it will be replaced by new capacity either at the same or a new plant site. For these reasons, a 20-year operating life expectancy for ethylbenzene/styrene plants would be a reasonable assumption. On this basis, the number of deaths estimated to occur over the life of the 13 existing plants would range from 0.55 to 3.9.

The ranges presented here represent the uncertainty of estimates made concerning the benzene concentrations to which workers were exposed in the occupational studies of Infante, Aksoy, and Ott, which were the basis for developing the benzene unit risk factor (discussed in Appendix E of "Benzene Emissions from the Ethylbenzene/Styrene Industry," EPA-450/3-79-035a). These ranges are based on a 95 percent confidence interval that assumes the estimated concentrations are within a factor of two.

There are several other uncertainties associated with the estimated number of Leukemia deaths that are not quantified here. The number of deaths were calculated based on an extrapolation of leukemia risk associated with a presumably healthy white male cohort of workers to the general population, which includes men, women, children, non-whites, the aged, and the unhealthy. Uncertainty also occurs in estimating the benzene levels to which people in the vicinity of EB/S plants are exposed. Furthermore, leukemia is the only health effect of benzene considered. Additionally, the benefits to the general population of controlling other hydrocarbon emissions from EB/S production are not quantified. Finally, these estimates do not include the cumulative or synergistic effects of concurrent exposure to benzene and other substances. As a result of these uncertainties, the number of deaths and the maximum lifetime risk calculated around EB/S plants could be overestimated. However, and more importantly, they could just as well be underestimated for the same reasons.

Based on the magnitude of benzene exposures from emissions from this source category, on the resulting estimated maximum individual risks and estimated incidence of fatal cancers in the exposed population for the life of existing sources in the category, and on consideration of the uncertainties associated with these quantitative risk estimates (including the effects of concurrent exposures to other substances and to other benzene emissions), the Administrator finds that benzene emissions from process vents at EB/S plants create a significant risk of cancer and require the establishment of a national emission standard under section 112 of the Clean Air Act.

The Administrator considered a number of alternatives to section 112 of the Clean Air Act for regulating benzene emissions from EB/S plants, including relying instead on the OHSA standard for benzene emissions and hydrocarbon control under State Implementation Plans (SIP's). The current OSHA benzene standard is ten ppm for an eight-hour workday. In 1978, the Secretary of Labor promulgated a more stringent standard that reduced the permissible exposure limit for benzene to one ppm. However, the one ppm standard was held to be invalid by the U.S. Court of Appeals because it was not supported by the administrative record and on July 2, 1980, the U.S. Supreme Court affirmed with the lower Court's ruling. The current OHSA standard stipulates a level of benzene which cannot be exceeded in the workplace. The Administrator does not expect this workplace standard to result in as great a control of benzene emissions from process vents.

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[3] Proposed rule and notice of public hearing for regulating benzene emissions from maleic anhydride plants was published in the Federal Register on April 18, 1980 (45 FR 26660).

Volatile organic compound (VOC) emissions from EB/S plants can be regulated under SIP's designed to meet National Ambient Air Quality Standards (NAAQS) for ozone. However, because SIP's are designed to provide statewide compliance with NAAQS for criteria pollutants, a particular State's strategy for reducing VOC emissions may not require as stringent benzene emission control for EB/S plants as that of another State or as may be appropriate in light of benzene's hazardous nature.

Finally, the Administrator considered using the Toxic Substances Control Act (TSCA) as an alternative, but concluded that the Clean Air Act provides a more direct, expeditious route for regulating benzene emissions from EB/S plants.

Selection of Sources Within Ethylbenzene/Styrene Plants To Be Regulated

The two processes used domestically to produce ethylbenzene are benzene alkylation with ethylene and mixed xylene extraction. The alkylation process represents 95 percent of ethylbenzene production. The two processes for producing styrene are ethylbenzene dehydrogenation and ethylbenzene hydroperoxidation. The hydroperoxidation process is currently used by only one plant and represents ten percent of styrene production.

The proposed standard would apply to the production of ethylbenzene from benzene alkylation and the production of styrene from ethylbenzene dehydrogenation and from ethylbenzene hydroperoxidation. The extraction of ethylbenzene from mixed xylenes is a refinery operation and is not covered because the actual ethylbenzene extraction step has no benzene emissions. Benzene emissions from associated refinery operations are to be regulated under a separate standard controlling benzene emissions from petroleum refinery processes.

The major benzene emission points from EB/S plants and the quantity of benzene each of them emits are summarized below. These emissions are based on a 300,000 Mg/yr model plant and include representative emission points throughout the EB/S industry, although not all plants contain each of these emission points.

Emission points	Benzene emissions kg/hr
Alkylation Reactor Section Vents	11.2
Atmospheric and Pressure Column Vents	45.0
Alkylation and Dehydrogenation Vacuum Column Vents	13.0
Hydrogen Separation Vents	1.0
Hydroperoxidation Vacuum Column Vents	18.7
Ethylbenzene Oxidation Reactor Vents	7.2
Storage	5.3
Fugitive	1.6
Secondary	2.5

The proposed standard would cover process emissions from all the emission points listed above except for the oxidation reactor vent, and fugitive, storage, and secondary emission sources. The sources covered by the standard include essentially all benzene-emitting process vents, except those emitting only traces of benzene (e.g., catalyst preparation area vent). The hydrogen separation vents emission rate reflects the emissions at a controlled rate rather than uncontrolled because, under most conditions, these emissions are controlled. Under uncontrolled conditions the emission rate would be substantially higher. The hydrogen separation vents are covered by the standard because there is one plant which does not control the source and there is a potential for plants to not control the source during routine production.

The oxidation reactor vent contains a relatively small concentration (35 ppmv) of benzene. However, its flow is much larger and much more dilute than the other process vents and consequently would require separate incinerator and a large amount of energy (approximately 3.2×10^6 Megajoules per year (MJ/yr)) to handle the large flow and control the benzene emissions. Because the large amount of energy that would be required to control this vent is grossly disproportionate to the benzene emission reduction (approximately 1.0×10^7 MJ/Mg), the Administrator has concluded that this impact outweighs the benefit from controlling this vent. Therefore, the oxidation reactor vent is not covered by the proposed standard.

Emissions from fugitive, storage, and secondary sources represent approximately ten percent of overall benzene emissions in the EB/S production processes. Separate standards are being developed which will cover fugitive and storage sources of benzene emissions, including EB/S sources. These standards will apply to a large number of similar benzene sources in chemical and other industries and will reduce the number of standards which would cover essentially the same sources.

Selection of Regulatory Options

The Administrator considered four regulatory options to reduce benzene emissions from the continuous process vent streams listed. These regulatory options are based on the control devices currently used in the EB/S industry, namely condensers, absorbers, flares, and boilers; the use of substitutes for styrene also was considered.

Condensation can achieve a varying degree of control for benzene emissions, ranging from 80 to 90 percent control of individual process streams, depending upon the prevailing temperature and pressure of the vent streams and the amount of benzene they contain relative to the other stream components. Two mechanisms exist for condensation: (1) Cooling alone using a condenser, or (2) increasing the system pressure in conjunction with cooling the stream in a condenser. Although a vent stream does not need to be saturated with benzene when using condensation, it should be near saturation before entering the condenser if a high degree of control is desired. Therefore, condensers are applied to gas streams which are continuous and highly concentrated. The gas streams fitting this description vary from plant to plant. Depending on the characteristics of the individual EB/S plant, condensers can be used to control as much as 75 percent of the continuous process emission vents. Five existing EB/S plants use condensers to control benzene emissions. Atmospheric and pressure distillation column vents and the benzene/toluene vacuum column are examples of those vents which are amenable to the use of condensers in some EB/S plants. Condensers, however, cannot handle short-duration, high-volume streams resulting from the intermittent release of the hydrogen separation vent.

Absorption can be used to handle streams dilute with benzene. The degree of control for benzene emissions, ranging from 80 to 99 percent, depends in part upon the equilibrium between benzene and the absorbing medium at the scrubbing temperature. Packed towers, using chilled polyethylbenzene oils as a benzene absorbent, can be used to control streams of low concentration. The gas streams fitting this description vary from plant to plant. Depending on the characteristics of the individual plant, absorbers can be used to control as much as 75 percent of the continuous process emission vents, such as the reactor vents and the vacuum column vents. One existing EB/S plant uses an absorption system to control benzene emissions.

Boilers can be used to control benzene-containing streams in all EB/S processes. A high control efficiency is achieved by boilers since injecting a vent stream at the burner head results in good fuel/air mixing, and combustion occurs at high temperatures. Based on expected boiler operating conditions and available test data, a 99 percent destruction efficiency is considered achievable for relatively constant gas flows.

Flares also can be used to control benzene emissions by combustion. Approximately 50 percent of all EB/S plants use flares for controlling continuous process emissions. To date, very little documented information exists on the representative destruction efficiency of flares for benzene or any other volatile organic compounds (VOC's). Based on engineering calculations and limited testing on natural gas by a flare vendor, a flare system can be expected to achieve a range of 60 to 99 percent destruction efficiency for VOC's. However, in the past, the Administrator has been reluctant to allow the use of flares as a continuous process emission control device because no practical measuring method exists to detemine if the flares are in compliance. Due to their potentially low or variable efficiency, the Administrator does not consider flares as a single effective control technique for continuous emissions.

Use of a styrene substitute that does not emit benzene during its production is another means of controlling benzene emissions. Although substitutes exist for certain end-uses, no substitute compound has been developed to date with the characteristics appropriate for all styrene.

Although EB/S plants could produce ethylbenzene from mixed xylenes instead of benzene, the Administrator does not consider this substitution as a viable regulatory option. The actual separation of ethylbenzene from mixed xylenes has no benzene emissions. However, as a result of switching ethylbenzene production to extraction from mixed xylenes, benzene emissions from other sources such as associated refinery operations and gasoline distribution may increase with ultimately no reduction in nationwide benzene emissions from all sources.

Combinations of the control devices studied were used in developing the regulatory options for continuous process emissions which the Administrator considered in selecting the basis of the standard. Because there are no technological reasons to consider different or alternative controls for new and existing sources, these regulatory options were considered applicable to both.

Regulatory Option A would involve routing the benzene/toluene column vent and the atmospheric and pressure column vents to condensers to achieve approximately 80 to 90 percent emission reduction and routing the alkylation reactor section vents and other vacuum vents to an absorber to achieve 80 to 99 percent emissions reduction. Based on these controls, this option would give an overall benzene reduction of 85 percent. Regulatory Option B would reduce benzene emissions by 94 percent based on the use of condensers and an absorption tower, which would achieve 85 percent control, combined with a flare with an assumed efficiency of 60 percent. Because of the variability in the destruction efficiency of flares, a 60 percent emissions destruction efficiency is assumed for this analysis as a conservative estimate. Regulatory Option C would reduce benzene emissions by 99 percent based on the use of boilers. This option would involve routing the vacuum column vents, the atmospheric and pressure column vents, the alkylation reactor vents, and the hydrogen separation vent to an existing boiler. Regulatory Option D would involve 100 percent control of benzene emissions based on closure of all ethylbenzene and styrene plants and on the use of substitutes for styrene products.

Existing data indicate that at certain times and under certain conditions process emissions can occur from the process vents previously discussed that could not be controlled practically by any of the regulatory options thus far identified. This is because the flow rate, composition, and pressure characteristics of these process vent streams, which occur under other than normal operation (startup, shutdown, or malfunction of process or control equipment), differ from the continuous process vent streams previously discussed. These emissions, under Regulatory Options A, B, or C, could also exceed the amount of emissions that would be permitted under these options. These "excess" emissions, therefore, would occur whenever the emissions reduction associated with Regulatory Options A, B, or C was not being achieved.

Some of these excess process emissions would be due to sudden and unavoidable process and control equipment failures and are, by definition, malfunctions. Though benzene emissions due to malfunctions can arise anywhere on the production train, certain pieces of equipment have been cited as likely sources of emissions. A hydrogen separation compressor outage is a common type of process or control equipment failure and can, on the average, emit for about ten hours per year approximatly 4,000 kg of benzene (based on a 300,000 Mg/yr model plant).

During normal operation, the compressor directs the stream from the dehydrogenation section to the aromatics recovery unit where the condensables are removed; then the remaining hydrogen-rich stream is routed to the boiler, mixed with natural gas, and is used as supplemental fuel. A primary compressor outage, however, would prevent aromatics recovery and utilization of the stream as fuel and could necessitate venting of the benzene-laden stream to the atmosphere. The primary compressor outage would produce a high-volume, short-duration stream flow.

The condensers and/or absorption towers assumed under Regulatory Options A and B could not be practically applied to controlling this stream since condensation and/or absorption efficiency rates cannot be maintained under these high stream flow conditions.

The boiler, assumed under Regulatory Option C, can attain a high benzene destruction efficiency (99 percent) when process vent stream flow rate and composition are fairly constant. When a primary compressor outage occurs, however, flow rate, pressure, and thermal value of the process vent stream varies significantly. These stream characteristics could risk operational upsets and possible damage to the boiler if the boiler does not have sufficient controls to regulate the fluctuations in stream flow, pressure, and composition. Operational upsets such as firebox temperature excursions would affect the rate of steam generation and thus, the rate of reaction. Temperature fluctuations also damage boiler tubes, thereby causing downtime and safety risks to personnel.

Excess process emissions can also occur during startup and shutdown. A startup involves bringing into full operation equipment in an entire plant, the dehydrogenation section, or alkylation reactor section, which are originally at ambient temperature and empty of process liquids. The procedure requires an average of approximately 12 to 24 hours to fully establish reactions and ensure that the quality of the product meets specifications. In this interim period, however, benzene emissions in excess of the emissions reductions specified under Regulatory Options A, B, or C can be released from certain points in the production train. Based on a 300,000 mg/yr model plant, approximately 4,200 kg or benzene can be emitted for an average of ten hours per year from the entire plant, most of which is from the hydrogen separation vent. Due to a lack of sufficient flow during startup, this stream is not compressed nor is it then sent to the aromatic recovery stream as is the case during normal production. Rather, typical practice involves either venting the stream directly to the atmosphere or flaring it until the dehydrogenation reaction is established fully.

The process vent stream composition during startup varies widely due to entrained nitrogen, reactants, and other process liquids. The condensers and/or absorption towers assumed under Regulatory Options A and B could not be practically applied to controlling this stream because these stream characterisics inhibit efficient absorption and condensation.

During the startup procedure, it is necessary to maintain stable boiler operation while adjusting relative feed rates of reactants and catalyst. Combusting this variable dehydrogenation stream in a boiler, which is the control device assumed under Regulatory Option C, would cause fluctuations in firebox flame temperature and stream saturation rate and would inhibit control of the reactions.

Shutdown involves terminating operation of all equipment in the entire plant, the dehydrogenation section, or alkylation reactor section, and allowing the equipment to cool to ambient temperature. The procedure involves cutting off feedstock to the reactors while concurrently decreasing the introduction of steam, so that the temperature of all equipment reaches ambient levels. During this procedure, benzene emissions in excess of the emissions reductions specified under Regulatory Options A, B, or C can occur. Residual benzene in equipment must be purged before maintenance can begin. During plant shutdown, as in plant startup, the bulk of benzene emissions occur at the hydrogen separation vent. Based on a 300,000 Mg/yr model plant, benzene emissions due to plant shutdown are approximately 4,200 kg/yr from the entire plant.

Variations in stream temperature, composition, flow, and pressure rate occur during the shutdown procedure. This stream cannot be controlled by condensation or absorption equipment due to the wide fluctuations in temperature, composition, flow, and pressure rate. Entrained liquids and nitrogen in the stream would inhibit this control equipment efficiency. During plant shutdown, the boiler firebox temperature and, consequently, steam output is being carefully reduced. This procedure therefore precludes manifolding the waste stream to the boiler.

After this consideration of the application of Regulatory Options A, B, and C to the control of excess emissions during startup, shutdown, and malfunction, the Administrator determined that a separate set of regulatory options should be considered for the excess emissions.

Excess benzene emission from EB/S plants can basically be controlled by combustion and/or backup compressors. Combustion can be accomplished in a boiler or by a flare. An existing boiler can theoretically attain a high benzene destruction efficiency of 99 percent. However, the variable flow, pressure, and composition of excess emissions encountered during periods of startup, shutdown, or malfunction would require major retrofit. Extremely complex controls and monitoring equipment would also be necessary to ensure operational stability and safety.

Smokeless flares are used by approximately 75 percent of existing EB/S plants for controlling excess emissions. Various vent streams can be manifolded to a properly-sized flare for thermal destruction. The main advantage of the flare is its ability to control high-volume, short-duration releases as normally are encountered during equipment malfunction. For example, flares can control emissions due to a hydrogen separation compressor outage, vent gas compressor outage, and streams of highly variable Btu value such as those encountered during startup and shutdown. Smokeless flares can reduce visible emissions to no more than five minutes or less within a two-hour period. A smokeless flare, however, achieves variable levels of control.

Backup compressors can be used to limit emissions resulting from primary compressor failure. A backup compressor can typically come on-line within an hour. This can effectively control 90 to 100 percent of benzene emissions resulting from a primary compressor outage. At present, approximately 50 percent of EB/S plants employ backup compressors. At these plants, however, the backup compressor was installed for conditions specific to those plants.

Based on the above control methods, the Administrator considered four regulatory options for controlling excess emissions during startup, shutdown, and malfunction. Because there are no technological reasons to consider different controls for new and existing sources, these regulatory options apply to both. Regardless of the option selected, avoidable excess emissions due to failures of process or air pollution control equipment caused entirely or in part by deficiencies in design, poor maintenance, careless operation, or other preventable equipment breakdown would be in violation of the proposed standard which requires that good air pollution control practice be followed. Furthermore, failure of process or control equipment, regardless of the cause, would be required to be repaired quickly; failure to do so would constitute avoidable excess emissions and a violation of the proposed standard. Under each of the regulatory options, each occurrence of excess emissions, regardless of the cause, would have to be reported to the Administrator. The Administrator then would judge if the excess emissions were avoidable.

Under Regulatory Option 1, excess emissions would be allowed only during malfunctions, startup, and shutdown. During these times these emissions would have to be combusted by one or more smokeless flares. Under Regulatory Option 2, EB/S owners or operators would have to meet the same requirements as Regulatory Option 1. In addition, they would be required to install backup compressors to control excess emissions during compressor malfunctions and to burn the emissions by one or more smokeless flares until the backup compressor was fully operational. Under Regulatory Option 3, EB/S owners or operators would be required to retrofit existing boilers to accept all excess emissions at all times, allowing these excess emissions to be flared only for short periods required to adjust boiler operation for acceptance of the waste stream at the beginning of an outage. Regulatory Option 4 is the only means of completely eliminating excess emissions from EB/S plants and would require 100 percent excess benzene emissions reduction based on EB/S plant closure.

Selection of Basis of Standard

The selection of the basis of the proposed standard for benzene emissions from EB/S process vents was a two-step process. The first step consisted of examining the environmental, energy, and economic impacts of various regulatory options and selecting one of them as the best available technology (considering environmental, energy, and economic impacts) (BAT). The second step in the process was to examine the residual health risks remaining after application of BAT to determine whether they were unreasonable in view of the health benefits and costs that would result if a more stringent option were applied. In determining whether the residual risks are unreasonable, and thus whether a level of control more stringent than BAT is to be required, the following factors are compared for the option selected as BAT and the option more stringent than BAT: (1) The range of estimated maximum risk to the most exposed individuals; (2) the range of total estimated cancer incidence and other health effects in the existing and future exposed populations through the anticipated operating life of existing sources; (3) readily identifiable benefits of the substance or activity; (4) the economic impacts of requiring additional control measures; (5) the distribution of the benefits of the activity versus the risks it causes; and (6) other possible health and environmental effects resulting from the increased use of substitutes. The selection of the basis of this standard as described in this section is consistent with these procedures.

In this case, BAT would be selected for EB/S process vents and the health impacts and costs that would result from application of a more stringent option would be examined. As previously discussed, EB/S process vent emissions are comprised of continuous process and excess emissions whose control would require different control techniques. Consequently, this necessitated development of two sets of regulatory options. In order to determine BAT for process vent emissions, the Administrator selected the combination of options for continuous process and excess emissions which he determined represented BAT for process vents. In making his selection, the Administrator examined the impacts of these two sets of options separately and selected BAT for continuous process emissions and BAT for excess emissions. He concluded this combination to be BAT for process vent emissions and then examined the residual risks after application of BAT for process vents.

Although Regulatory Options A, B, and C do not require the use of the specific control device upon which they are based, the control devices were used as a basis for estimating the environmental, energy, and economic impacts of the regulatory options for continuous process emissions on the EB/S industry, using a 300,000 Mg/yr model plant as a representative plant. Regulatory Options 1, 2 and 3 would require specific control devices; these were used in estimating the environmental, energy, and economic impacts of the regulatory options for excess emissions, using the same model plant. Although differences exist between EB/S plants, only one emission point at one plant, the ethylbenzene hydroperoxidation reactor vent, was significant enough to affect the regulatory analysis. Therefore, this analysis was performed using one model plant, with a separate study of the hydroperoxidation reactor vent. To determine nationwide impacts for each regulatory option, the model plant impacts were scaled to each existing plant according to capacity and present level of control. Because new EB/S plants should not differ greatly from existing plants, the 300,000 Mg/yr model plant is considered representative of both. Because Regulatory Option D for continuous process emissions and Regulatory Option 4 for excess emissions assume 100 percent emissions control based on plant closure, only the economic impacts of plant closure were estimated.

Impacts for Continuous Process Emissions

Environmental Impacts. In terms of nationwide air quality impacts, estimated total benzene emissions from continuous process vent streams alone in the EB/S industry are 1,990 Mg/yr, at current control levels and at 100 percent production capacity. Regulatory Options A and B would reduce total continuous process benzene emissions from the industry to 625 Mg/yr and 200 Mg/yr, respectively. Regulatory Option C would reduce total continuous process benzene emissions from the industry to 70 Mg/yr.

Based on dispersion modeling, the highest estimated maximum annual average benzene concentrations which occur within the industry, including emissions from fugitive and storage sources, occur at 160 meters (m) for each option and are 95.8 ppb under existing conditions, 54.1 ppb under Regulatory Option A, 46.1 ppb under Regulatory Option B, and 46.0 ppb under Regulatory Option C. The highest estimated maximum annual average concentrations which occur within the industry due to process vents alone are estimated at 63.6 ppb under existing conditions and 18.2 ppb under Regulatory Option A at a distance of 160 m, 1.4 ppb under Regulatory Option B at a distance of 500 m, and 0.19 ppb under Regulatory Option C at 1,000 m.

None of the regulatory options considered result in any significant increase in wastewater or effluent discharge by EB/S plants nor do they generate any solid waste. Noise and thermal radiation associated with the use of flares, which would be required for reducing benzene emissions from process stream sources if Regulatory Option B were adopted, are negligible.

Energy Impacts. Energy impacts of each regulatory option were also considered. Under Regulatory Option A, energy is required to operate pumps and compressors for the condensers and absorbers. Energy also is required for the cooling system of the condensers. Total energy required for this option is approximately 0.1 percent of the fuel requirements for the model plant. Under Regulatory Option B, flare operation consumes both steam (for smoke control) and natural gas (as a supplemental fuel). In conjunction with the condensers and absorbers, the total energy demand for Regulatory Option B also would approximate 0.1 percent of the fuel requirements for the model plant. Due to heat recovery, Regulatory Option C would result in a small net energy savings, equivalent to approximately 0.1 percent of the fuel requirements for the model plant.

In terms of nationwide energy impacts, Regulatory Options A and B for all existing EB/S plants would require approximately 0.1 percent of the total nationwide EB/S fuel requirements. Due to recovered energy, Regulatory Option C would result in a small total nationwide energy savings, equivalent to approximately 0.1 percent of the current nationwide EB/S fuel requirements.

Economic Impacts. The Administrator considered both capital and annualized costs for Regulatory Options A, B, and C. Nationwide impacts were determined from these cost estimates. Capital and annualized costs for individual pieces of control equipment were based on the equipment requirements of a 300,000 Mg/yr EB/S model plant to achieve a given level of emission reduction. Current control levels and installed equipment at existing plants were accounted for in determining equipment required at each existing facility to achieve given levels of control.

Regulatory Option A requires the smallest capital outlay of the regulatory options and would range from zero to $268,000 per plant, depending on the current level of control, plant size, and additional equipment needed to meet the control level specified. Regulatory Option B in most cases would require large amounts of piping in addition to pieces of equipment needed in the flare system. Capital costs for this regulatory option would range from zero to $530,000 per plant. Capital costs for Regulatory Option C range from zero to $555,000 per plant, accounting for additional piping and burner retrofit.

Total annualized costs, including operating and maintenance costs, annualized capital costs, and recovered material and fuel credits, would range from $13,500 to a savings of $172,000 per plant under Regulatory Option A; a cost of $45,000 to a savings of $172,000 per plant under Regulatory Option B; and a cost of $26,000 to a savings of $150,000 per plant under Regulatory Option C. The range would be due to differences in the treatment of the various vent streams in each of the plants. Some facilities already control those streams which are close to saturation with benzene and for which treatment results in a net savings. In these cases, the incremental recovery credits are small. Others have a lesser degree of control on these streams. In these cases, the fuel and recovery credits can far exceed the annualized costs of the control device by reducing the amount of supplemental energy and benzene typically required in the process.

In terms of nationwide impact, Regulatory Options A, B, and C each would require 12 plants to install controls. Total nationwide capital costs to the industry would be approximately $1.4 million, $3.1 million, and $3.4 million under Regulatory Options A, B, and C, respectively. No EB/S plants are expected to close as a result of capital costs attributed to controls under Regulatory Options A, B, and C. Based on a review of representative company capital expenditures and financial information, the capital cost of the controls considered are well within the scope of normal spending and the parent companies should have little difficulty with either debt or equity financing.

The industry's total annualized cost, assuming full utilization of capacity and including operating and maintenance costs, annualized capital costs, and fuel and recovered material credits, would be net credits of approximately $606,000 under Regulatory Option A; approximately $202,000 under Regulatory Option B; and approximately $460,000 under Regulatory Option C. Total annualized cost per Mg capacity of styrene would be a net credit of $0.15/Mg under Regulatory Option A; $0.05/Mg under Regulatory Option B; and $0.11/Mg under Regulatory Option C. These savings in Regulatory Options A and B are due to a reduction in benzene requirements as a result of material recovery, and the savings in Regulatory Option C are due to a reduction in process energy requirements as a result of energy recovery from the combusted waste stream in the form of steam. In terms of individual firms, only four companies would experience a total annualized savings under Regulatory Option B, while more than half would realize a savings under Regulatory Options A and C.

Assuming a 15 percent target rate of return, full utilization of capacity and a base price of $463/Mg, styrene unit prices would be expected to increase at a maximum by $0.70/Mg under Regulatory Option A (0.15 percent of product price); $2.14/Mg under Regulatory Option B (0.46 percent of product price); and $1.27/Mg under Regulatory Option C (0.27 percent of product price).[4]

Styrene is used in the manufacture of polystyrene for packaging, food containers, insulation, and furniture; acrylonitrile-butadiene-styrene resins (ABS) for piping and automotive parts; and styrene-butadiene elastomers (SBR) for synthetic rubber, tires, hoses, belting, and adhesives. Any price increase in styrene is expected to be reflected in the price of these goods.

Employment impacts were analyzed for a number of cases. Even under the worst case, the jobs created under Regulatory Options A, B, and C would exceed any employment loss due to any production decrease under those regulatory options. Net employment factors under each regulatory option, except for Regulatory Option D (100 percent control), would probably be positive but small.

Complete prohibition of benzene emissions at ethylbenzene and styrene plants under Regulatory Option D would require closure of ethylbenzene and styrene production because no technology exists which will achieve a zero emission limitation. Banning production of ethylbenzene and styrene would have a negative impact on the producing companies. In 1978, domestic styrene production was valued at $1,135 million; investments in styrene are estimated to be worth approximately $925 million as a high-side estimate; and direct employment in the industry is estimated at 650 to 950 workers. Output, income, and employment impacts would be geographically concentrated to some degree in Texas and Louisiana. A multiplier impact affecting related industries, decreased output, lower overall income, and increased unemployment could be anticipated in these areas.

Regulatory Option D could have a greater negative impact depending upon whether the production of styrene derivatives also must be discontinued. If derivative chemicals are no longer available, specialized fabricators who process such chemicals may face closure. If styrene monomers could be imported in sufficient quantities, styrene derivative production could continue in the United States. The availability of large quantities of styrene monomer for import is questionable. The United States traditionally has been a net exporter of styrene. In 1976, U.S. styrene facilities represented 40 percent of total world capacity. In the near term, it would be unlikely that sufficient imports would be available. In the long term, foreign producers of styrene might choose to further process the monomer themselves and make styrene derivatives available for world consumption.

The magnitude of Regulatory Option D's impact on styrene derivative production could be large. Styrene plastics materials (the intermediate product derivatives) are produced by more than 40 companies throughout the United States. In 1978, production of styrene plastics materials was valued at $1,812 million, and asset values for this industry are estimated to total $1,236 million. Styrene monomer production directly involves less than 1,000 employees, while derivative chemical production may involve more than 10,000 employees.

Banning the production of ethylbenzene and styrene could sharply curtail the availability of many consumer products. Tires in particular would be affected by such a ban because there are no readily available substitutes for SBR from styrene. While natural rubber currently is used in tire manufacturing, there would be insufficient capacity to keep up with demand should styrene not be available.

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[4] The maximum price increases are based on the highest price increases required by any one company to cover the cost of meeting the proposed standard. Because the industry is assumed to be operating at 100 percent capacity, the demand for styrene is greater than the supply. Therefore, as the one company raises its prices, other producers can be expected to increase prices similarly to take advantage of the price the market will bear.

As a result, tire prices most likely would rise.

Other natural products such as wood, glass, and paper are available substitutes for plastics, but this type of substitution is limited because of plastic material's technical superiority in some cases. Other man-made products could serve as substitutes for styrene. However, the cost could be too high to be considered justifiable, and if it were justifiable, the prices of the products would increase substantially.

Impacts for Excess Emissions

Environmental Impacts. The estimated total nationwide excess benzene emissions for the EB/S industry are 133 Mg/yr under current controls; 21 Mg/yr under Regulatory Option 1; 10 Mg/yr under Regulatory Option 2; and 1 Mg/yr under Regulatory Option 3. The highest projected maximum annual average benzene concentrations due to uncontrolled excess emissions from within the industry occur at 160 m and are 7.9 ppb. (Uncontrolled conditions means that the current level of controls for excess emissions at existing EB/S facilities, which vary from plant to plant, are not reflected in the calculations.) The highest projected maximum annual average benzene concentrations occur at 2,000 m for each regulatory option and are 4.3×10^{-3} ppb under Regulatory Option 1, 1.4×10^{-3} ppb under Regulatory Option 2, and 2.0×10^{-4} ppb under Regulatory Option 3.

None of the regulatory options considered result in any significant increase in wastewater or effluent discharge by EB/S plants nor do they generate any solid waste. Noise and thermal radiation associated with the use of flares are negligible.

Energy Impacts. Energy requirements for each regulatory option are minimal. Under Regulatory Option 1, a ten-inch smokeless flare is assumed for combusting vent streams generated during startup or shutdown operations and malfunction. Based on average of 12 hours of operation per year for a 300,000 Mg/yr model plant, total steam and natural gas requirements are approximately 5.23×10^6 MJ/yr.

Under Regulatory Option 2, a ten-inch smokeless flare is assumed to be used for combusting vent streams generated during startup or shutdown operations and malfunction. Total energy requirements for steam and natural gas for the model plant is approximately 5.14×10^6 MJ/yr. The backup compressor has no incremental energy impact since only one compressor will be in use at a given time.

Under Regulatory Option 3, all safety valves used in relieving surges in process streams would be manifolded to a smokeless flare, assumed for this case to be ten inches. Total energy requirements for steam and natural gas are approximately 5.1×10^6 MJ/yr for the model plant. Regulatory Option 3 also requires that an existing EB/S boiler be retrofitted to accept vent streams generated as a result of plant startup, shutdown and malfunction. Energy requirements for the boiler are negligible as are credits in terms of steam generated as a result of combusting the waste stream.

In terms of nationwide energy impacts assuming no current excess emissions control, Regulatory Option 1 would require 71×10^6 MJ/yr, Regulatory Option 2 would require 70×10^6 MJ/yr, and Regulatory Option 3 would require 69×10^6 MJ/yr of energy, or approximately 11,200 bbl/yr (fuel oil equivalent) under each option for all existing EB/S plants.

Economic Impacts. Industry-wide capital costs for Regulatory Option 1 would be approximately $524,000 and would require four plants to install excess emission controls. Regulatory Option 2 would require capital outlays of approximately $5.5 million and would require six plants to install controls.[6] Regulatory Option 3 would require the greatest capital outlays, approximately $20 million, and would require 13 plants to install controls. Industry-wide annualized costs for Regulatory Options 1, 2, and 3 would be $171,000, $1.6 million, and $5.2 million, respectively.

Regulatory Option 4 would have the most severe economic impact on the EB/S industry. Because 100 percent excess emission control is technically infeasible, selection of this option would necessitate plant closure. Banning production of ethylbenzene and styrene would have a negative impact on the producing companies and consumers. This impact has been discussed in detail in assessing the economic impact of Regulatory Option D (100 percent process emission control).

Selection of Option for Standard

In selecting the combination of options for the proposed standard, the Administrator first selected BAT for process vents, represented by the combination of BAT for continuous process emissions and BAT for excess emissions. This combination was based on the evaluation of impacts of the two sets of regulatory options developed for controlling these emissions. The Administrator then examined the residual risk after application of BAT for process vents and the health impacts and costs that would result from the application of a more stringent option.

In selecting BAT for continuous process emissions, the Administrator first examined the most stringent option, Regulatory Option D, which would result in closure of EB/S plants. After considering that styrene is a major feedstock used in the production of a number of desirable products such as polystyrene, plastics and rubbers; that styrene substitutes are not readily available in sufficient quantities; that banning ethylbenzene and styrene production would result in a severe economic hardship to the producers of ethylbenzene and styrene and to producers of styrene derivatives, and probably result in price increases to consumers; and that a large number of people would be unemployed, at least temporarily, if these plants were closed; the Administrator concluded that the economic consequences of a standard requiring 100 percent control were too severe to select as BAT. He next examined Regulatory Option C, 99 percent control. After considering that Regulatory Option C would have a net energy savings, no significant adverse environmental impacts, reasonable costs, and no adverse economic impacts, the Administrator selected this regulatory option as BAT for continuous emissions for process vents. It should also be noted that the next less stringent option, Regulatory Option B, would result in higher costs and higher energy consumption than the regulatory option selected as BAT.

In selecting BAT for excess emissions from process vents, the most stringent option, Regulatory Option 4, was examined first. Its economic impacts on EB/S and related industries and its social impact on users of styrene products were determined to be too severe to justify its selection as BAT.

The next less stringent option, Regulatory Option 3, then was examined. The industry-wide capital costs for this option ($20 million) are greater than the costs ($3.4 million) for the regulatory option selected as BAT for continuous process emissions and no recovery credits are involved. Therefore, the industry-wide annualized costs of this regulatory option would be many times higher than the annualized costs for the regulatory option selected as BAT for continuous process emissions. In addition, the emission reduction which would be achieved by this regulatory option (132 Mg/yr) would be very small in comparison to the continuous process emissions reduction achieved by application of 99 percent control (2,030 Mg/yr). For these reasons, the Administrator concluded that the cost impacts of Regulatory Option 3 were too severe for it to be considered as BAT for excess emissions.

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[6] In calculating the capital costs for Regulatory Option 2, it is assumed that of the six plants which require backup compressors, four also require flares. For Regulatory Option 3, it is assumed that of the 13 plants which require boiler retrofits, four also require flares.

The next less stringent option, Regulatory Option 2, then was considered. The industry-wide capital costs for this option ($5.5 million) are also greater than the costs ($3.4 million) for the regulatory option selected as BAT for continuous process emissions. However, no recovery credits are involved. Therefore, the industry-wide annualized cost of this option would be many times higher than the option selected as BAT for continuous process emissions. Furthermore, the emissions reduction which would be achieved by this option (123 Mg/yr) would be very small in comparison to the continuous process emissions reduction achieved by application of 99 percent control (2,030 Mg/yr). Therefore, the Administrator concluded that the cost impacts of Regulatory Option 2 were too severe to be considered as BAT for excess emissions.

Regulatory Option 1 was then examined. This option would require the use of smokeless flares, which most plants already have, to control unavoidable excess emissions. Assuming that plants which currently have flares would use them to meet the proposed standard, only four plants would be required to install smokeless flares if this option were selected as the standard. The total capital costs for these four plants would be only $524,000. The Administrator concluded that these costs were reasonable, and selected Regulatory Option 1 as BAT for excess emissions.

Based on the selection of Regulatory Option C as BAT for continuous process emissions and Regulatory Option 1 as BAT for excess emissions, the Administrator designated this combination as BAT for process vents. He then examined the residual risks remaining after application of BAT for all emissions from process vents at existing EB/S plants to determine whether they are unreasonable in view of the risk reduction which would be gained by requiring a level of control beyond BAT and the cost increase if that level of control were required.

It was estimated that after application of BAT to EB/S process vents there would be a range of 1.3×10^{-4} to 9.2×10^{-4} residual deaths per year within 20 km of existing EB/S plants due to benzene emissions from process vents, and from 0.0026 to 0.018 deaths over the assumed 20-year operating lifetime of the existing plants. In calculating these deaths, it was estimated that 2.5 million people live within 10 km of existing EB/S plants (1970 census data) and it was estimated that EB/S plants are operating at 100 percent of capacity. The maximum lifetime risk to the most exposed population after application of BAT was estimated to range from 1.7×10^{-6} to 1.2×10^{-5} due to continuous process and excess emissions. The maximum lifetime risk represents the probability of a person dying of leukemia who has been exposed for a 70-year period to the highest maximum annual average benzene concentration due to benzene emissions from EB/S process vents.

The next more stringent regulatory option for EB/S process vents would be a combination of Regulatory Option C and Regulatory Option 2. (It is noted that any combination containing Regulatory Option D, industry closure, would not represent the next more stringent option beyond BAT since there are combinations that exist which would attain process vent emission reductions greater than BAT and would not result in closure.) The Administrator then examined the impacts of applying this option. This combination would reduce the number of deaths per year to a range of 9.5×10^{-5} to 6.6×10^{-4}, or 0.0019 to 0.013 deaths over the assumed 20-year operating lifetime of the existing plants. The maximum lifetime risk would be reduced to a range of 1.7×10^{-6} to 1.2×10^{-5}. However, the industry-wide incremental capital costs associated with going from BAT to beyond BAT would increase from $3.9 million to $9.9 million and the industry-wide annualized costs would increase from a net savings of $289,000 to a cost of $1.1 million. In view of the relatively small health benefits that would be gained and the costs of requiring a more stringent option than BAT for process vents, the Administrator concluded the remaining cancer risk from process vents after application of BAT to such vents at existing sources is not unreasonable.

It should be noted that the standard applies only to EB/S process vents and does not cover emissions from fugitive and storage sources. Assuming that the emissions from fugitive and storage sources remain uncontrolled, the reduction in continuous process emissions after the application of BAT would reduce the nationwide incidence due to process, fugitive, and storage emissions from all EB/S plants to a range of 0.017 to 0.11 residual deaths per year. The maximum lifetime risk to the most exposed population after the application of BAT to process emissions would be reduced to a range of 4.1×10^{-4} to 2.9×10^{-3} due to combined emissions from continuous process, fugitive, and storage sources. The selection of BAT for process vents does not preclude future regulation of fugitive and storage emission sources, which are the predominant contributors to the residual risk.

In order to select an option as BAT for new sources and then determine whether a level of control beyond BAT should be required for new sources, it would be necessary to examine the environmental, energy, and economic impacts of requiring the various levels of control represented as Regulatory Options A through D for continuous process emissions and Regulatory Options 1 through 4 for excess emissions for new sources. This would typically be done using the expected growth rate for the industry over the five-year period after the anticipated proposal date of the standard. However, a recent analysis of the EB/S industry revealed that no new facilities are projected to be built within the next five years.

Beyond the five-year period following promulgation of the standard, growth in EB/S production is likely to occur. (It is not projected over the next five years primarily because the industry is not operating at full capacity.) Five years after promulgation, the standard will be reviewed by EPA to examine, among other data, any new information on development in control technology which could be applied to new EB/S sources. In addition, EPA will implement the other new source features of its proposed airborne carcinogen rules after the five-year review if new source construction appears likely at that time.

Selection of Format of Standard

A number of formats for limiting benzene emissions from EB/S process vents were considered. Since the regulatory option selected for the proposed standard for process vents is actually the combination of two separate regulatory options, each controlling different process stream emission characteristics, it is necessary to specify two formats, one for continuous process emissions and one for excess emissions.

The regulatory option selected for controlling continuous process emissions represents a 99 percent emission reduction and is based on the use of a boiler. Because emissions from a boiler can be measured, the Administrator determined that an emission limitation standard for continuous process emissions would be appropriate, and considered a mass emission standard, a percent reduction standard, and a concentration standard.

Two considerations were important in selecting the appropriate format: (1) Minimizing the number of measurements and calculations required to determine compliance with the standards, and (2) avoiding a standard which would discourage product or fuel recovery from effluent streams containing benzene.

A mass standard based on a mass unit of benzene emitted per mass unit of feed, intermediate product, or final product produced was considered. Although it would allow EB/S plants flexibility in choosing to recover benzene from offgases, it would require consideration of the separate processing stages, which can be run independently of each other at different rates and at different facilities, and would involve determining mass emissions from each source along the production train while tying these measurements with production rate. Consequently, a standard of this format would complicate determining compliance, and also monitoring, because of the large number of measurements required. Therefore, the Administrator considered it inappropriate for EB/S plants.

A percentage reduction standard based on the amount of benzene exiting the control device versus the amount entering the device was considered. This option provides no incentive to reduce the amount of benzene entering the control equipment, and may discourage process changes which recover benzene from effluent streams. Moreover, it may offer a reverse incentive to increase the amount of benzene entering the control device to achieve the desired efficiency level while allowing larger final emission rates, and would involve measuring both incoming and outgoing streams at each point of control. Consequently, this option also was considered inappropriate.

A benzene concentration standard, expressed as ppmv, entails a minimal number of measurements and calculations for both the emissions test and for continuous monitoring. Because it only measures the benzene concentration in the exit stream, it does not discourage benzene recovery. Furthermore, at the inlet concentrations which are found at EB/S plants, the Administrator believes that the control device most likely to be used to meet the standard (boilers) will reduce benzene emissions to a constant benzene concentration. In other words, the exit concentration is not a direct function of the inlet concentration. As the inlet concentration is increased, the reduction efficiency increases with little or no change in the outlet concentration or the mass emissions. Therefore, the Administrator considers a benzene concentration standard to be the most appropriate format based on the considerations discussed above, and selected this format to limit benzene emissions from EB/S plants.

Since the standard for continuous process emissions is based on the use of boilers as the best available control technology, it is necessary to ensure that dilution is not used to meet a benzene concentration level standard. Enforcement of a concentration standard must account for the potential for dilution and, therefore, correction factors are included in the proposed standard to ensure that the benzene concentration measurements from all control devices are similarly referenced and that the quantity of benzene emitted is the same regardless of the amount of excess air used in the boilers. This is done most effectively by referencing all calculations to a dry basis and specific oxygen concentration level in the exhaust gases.

The Administrator has determined that the application of measurement methodology to excess benzene process emissions is not practicable due to technological limitations in the measurement of benzene flare destruction efficiency. Therefore, the Administrator has prescribed the use of a smokeless flare for excess benzene emissions in conjunction with certain work practices and operational standards. Included as part of the proposed standard are requirements that would assure the proper operation and maintenance of any such element of design or equipment.

Selection of Emission Limits

The selection of the numerical emissions limit is based upon the results of two emission tests performed at two EB/S plants. The test at the first plant showed that process heaters receiving benzene-containing vent streams could reduce benzene emissions to between nine and ten ppm referenced to three percent oxygen. However, these results may not reflect the actual benzene levels in the process heater flue gas because various sampling and analytical problems occurred during the test. Therefore, the test results from the first plant are suspect.

The test results from the second plant showed that benzene emissions could be reduced to between zero and 0.5 ppm, with a mean average of 0.39 ppm corrected to three percent oxygen on a dry basis, in a superheater and between zero and 1.4 ppm, with a mean average of 0.5 ppm corrected to three percent oxygen on a dry basis, in a hot oil furnace. These results can be considered representative for the superheater design at the second plant tested because the problems which occurred at the first plant were corrected at the time of the second test and Method 110, the recommended test method, was properly followed. However, because of the design of the superheater at the second plant, the emissions may be lower than those from a more typically designed superheater. The superheater at that plant was receiving approximately 1,500 ppm benzene while other superheaters, on the average, receive up to twice that amount of benzene. Furthermore, due to the burner configuration, benzene passed sequentially through two combustion zones and might have undergone greater destruction than if it has passed through a single combustion zone. The hot oil furnace was receiving approximately 50 to 100 ppm benzene and was reducing these emissions to between zero and 1.4 ppm benzene in the flue gas at three percent oxygen.

Because of the problems experienced during the test at the first plant, the results were not used in calculating the numerical emissions limit. Although the test results from the second plant show that less than two ppm can be achieved, the Administrator is proposing the numerical emission limit at five ppm to provide allowances for varying burner designs and boiler capacities.

Selection of Emission Test Methods

The proposed emission test method for determining benzene emissions is Method 110. Method 110 requires a gas chromatograph with a flame ionization detector for benzene analysis. This test method was used in the emission test at the second plant discussed in the "Selection of the Emission Limits" and was found to be satisfactory in confirming benzene emission levels.

The owner or operator of a source would be required to test emissions within 90 days of the promulgation date for an existing source and within 90 days of startup for a new source, unless a waiver of emission testing is obtained under § 61.13, and to notify the Administrator 30 days in advance of the emission test to afford the Administrator the opportunity to have an observer present during the test.

Each emissions test would consist of three runs, with a time-weighted average of the runs used to determine the emissions. The sampling time for each run would be a minimum of one hour. All calculations of benzene concentration are referenced to a three percent oxygen concentration level in the exhaust gases. Method 3 of 40 CFR

Part 60 shall be used to determine this oxygen concentration. The same sample collected for benzene determination is analyzed for oxygen concentration using an Orsat analyzer. The owner or operator of a source would be required to analyze each sample within 24 hours, to determine the emissions from the test within 30 days of the test, and to notify the Administrator of the results by close of business the following day.

After receipt and consideration of written application, the Administrator may approve alternative emission test methods.

Selection of Monitoring Requirements

In general, monitoring provides an effective and rapid means for enforcement personnel to determine if (1) the control device is operating, (2) the process vent streams covered by the standard are being directed to the control device, and (3) the control device is achieving the emissions limit. If the emissions limit were exceeded, it could be due to control device failure or to intentional altering of the control device.

A gas chromatograph is used to monitor emissions for two other chemical industries regulated under section 112 because it can measure directly the concentration exiting the control device, and therefore can detect if the emissions limit of the standard is exceeded. The gas chromatograph also can detect, by a significant change in the concentration exiting the control device, if large streams are not being routed to the control device, and can determine if the control device is operating.

However, for the purpose of this standard, a gas chromatograph is not the best means of monitoring emissions because the standard is based on the use of a boiler as the control device. This equipment is an integral part of the EB/S process because it produces steam and process heat required for styrene production. Therefore, in this case, the nature of the control device makes monitoring unnecessary to determine if the control dervice is operating. In addition, the EB/S process involves a number of small, individual process vents which are required to be routed to the boiler. Because these vents are so small, a gas chromatograph would not be able to detect if one of these small streams were not being routed through the boiler.

A gas chromatograph could, however, meet the third monitoring objective, i.e., to determine if the control device was achieving the emissions limit, but it would not be necessary. Because the boiler is central to the EB/S process, an incentive exists to operate the device correctly and, in the event of a control device failure, to repair it quickly. Furthermore, even though a gas chromatograph could detect if the numerical emission limit is exceeded during a control device failure, it would provide no data on the cause of the failure. Other monitoring method currently used at EB/S plants could not only detect the failure, but also provide operational data on the boiler to determine the caue of the failure. In addition, these methods would be less expensive and easier to operate than a gas chromatograph.

Examples of these other monitoring methods are the use of indicators and recorders for firebox temperature and flue gas oxygen. During normal operation, these parameters undergo only minor variation. However, during control device failures in which the numerical emission limit would be exceeded, large fluctuations in firebox temperature, flue gas oxygen, or both occur. by detecting these fluctuations, a system monitoring these parameters would determine if the five ppm benzene limit is not being achieved.

Flow meters could be used to determine if the vent streams are being properly routed to the boiler. Such a monitoring sytem typically would require a large number of flow meters, as many as a dozen or more, to monitor all vent stream piping. However, flow meters only at two or three central points in the piping system, such as at compressor outlets, and visual checks of other items, such as valve positions, could be equally effective for monitoring stream flow. This system would be more practical and involve less recordkeeping than a monitoring system based on flow meters on every stream.

A combination of these monitoring methods would provide even greater information concerning the cause of a malfunction than each would individually. For example, if the flow meter detected a disturbance, the oxygen monitor and firebox temperature monitors would also corroborate that a problem existed and could provide data concerning the cause of the malfunction.

Because a combination of these alternate monitoring techniques (1) would effectively meet the monitoring objectives for EB/S plants using boilers as the control device, (2) currently are used within the EB/S industry, and (3) would provide better data on the causes of malfunctions than a gas chromatograph, the Administrator has selected a combination of the alternatives as the proposed monitoring method. The proposed standard would require that owners or operators of sources using boilers as the control device install and continuously operate: (1) A flue gas oxygen monitor with a strip chart recorder, (2) a continuous firebox temperature monitor with a strip chart recorder, and (3) a flow meter which prints a record at least every 30 minutes on each compressor or natural gas ejector. In addition, owners or operators would be required to visually check each process vent stream to determine if each stream covered by the proposed standard is being sent to the boiler. This information would be kept in a weekly log signed by the plant operator.

A 100°F firebox temperature margin below the temperature recorded during the emission test and a 1.5 percent flue gas oxygen level represent clear breakpoints between normal fluctuations in boiler operation and serious failures. Even with normal fluctuations, a correctly operating boiler would be well above these temperature and oxygen limits, while one experiencing a failure would drop significantly below these levels. Therefore, these limits for firebox temperature and oxygen level were selected as parameters which would indicate compliance with the numerical emission limits. However, such a clear breakpoint does not exist for flow meters. Wide fluctuations of flow could be expected under normal operation. Consequently, a flow limit of zero was set to ensure that the flow meter indicates only when a process stream is not being routed to the control device, and not when normal flow fluctuations occur. A three-hour averaging period for these parameters was chosen to be consistent with the averaging period for the numerical emission limit. Finally, the frequency of visual checks was limited to a weekly basis because this would provide sufficient indication that all process vent streams are being routed to the control device without being burdensome to plant personnel. Furthermore, more frequent monitoring, such as daily visual checks, would not necessarily provide any better information about stream flows.

For sources which use air pollution control equipment other than boilers, the Administrator has determined that a gas chromatograph would best meet the monitoring objectives. The proposed standard therefore would require that the owners or operators install and continuously operate a gas chromatograph with a flame ionization detector to monitor the concentration of benzene exiting the control device controlling the process vents. To determine if all the process vent streams are being routed to the control device, the proposed standard would require owners or operators to install and continuously operate a flow meter that prints a record every 30 minutes on each process vent stream or combination of process vent streams before entry into the control device. They also would be required to make a weekly visual check of each process vent and to keep a weekly log of each. However, because the majority of EB/S plants are expected to use a boiler to combust benzene emissions, this monitoring method is not expected to be used frequently.

The owner or operator of each source would be required to calibrate the required monitoring equipment and certify that the equipment is installed, operated, and maintained according to certain specifications as indicated in the regulation.

The capital investment required per plant to comply with the proposed monitoring requirements would be a maximum of $16,000 for installing two oxygen and temperature monitors and three flow meters, or $58,000 for installing a gas chromatograph and three flow meters. This maximum per plant cost assumes that plants do not have any of the required monitoring equipment. Many EB/S plants, however, currently have some of the required equipment for use in standard process operation. Therefore, the actual per plant cost would vary from plant to plant.

After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements specified in the proposed standards.

Reporting and Recordkeeping

Owners or operators of sources using boilers as the air pollution control device would be required to submit monitoring and operational data within ten days of any of the following, except during plant startup and shutdown: (1) Oxygen levels below 1.5 percent for a three-hour average, as determined by any flue gas oxygen monitor.

(2) Temperatures 100°F below that registered in the emission test for a three-hour average, as indicated by any firebox temperature monitor.

(3) A flow of zero registered by any flow meter on a compressor or natural gas ejector for a three-hour period.

(4) Two or more weekly visual checks within a 90-day period that determine if any stream is not being routed to the boiler.

Owners or operators of sources using air pollution control equipment other than boilers would be required to report monitoring and operational data within ten days of any of the following, except during plant startup and shutdown: (1) Any release of benzene from process vent streams to the atmosphere in excess of five ppmv benzene for a three-hour average as indicated by a continuous monitoring system.

(2) A flow of zero registered by any flow meter on a process vent stream or combination of process vent streams for a three-hour period.

(3) Two or more weekly visual checks within a 90-day period that determine if any stream is not being routed to the air pollution control device.

The standard would require that each monitoring system be operational before conducting the emissions test required under the proposed standard. All monitoring data, emission test results, and other data needed to determine emissions would be kept and made available to the Administrator for two years following their recording. In addition, owners or operators would be required to notify the Administrator 30 days in advance of plant startup and shutdown. Because the above reporting does not apply during plant startup and shutdown, this notice would identify for the Administrator that period during which the owners or operators would not be subject to the emission monitoring reporting requirements.

The cost to the EB/S industry to keep records and to collect, prepare, and report the data specified by the proposed standard through the first five years would be approximately $122,000.

Public Hearing

A public hearing will be held to discuss the proposed standard for benzene emissions from EB/S plants in accordance with sections 112(b)(1)(B) and 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations on the proposed standard should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble, and should refer to Docket No. A-79-49.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

This docket is an organized and complete file of all the information submitted or otherwise considered in the development of this proposed rulemaking. This principal purposes of the docket are (1) to allow interested parties to readily identify and locate documents so they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

In accordance with section 117 of the Act, appropriate advisory committees, independent experts, and Federal departments and agencies were consulted before this proposal was published. In addition, members of the benzene task group of the Interagency Regulatory Liaison Group, representing EPA, OSHA, the Food and Drug Administration, and the Consumer Product Safety Commission, have met and reviewed the proposed regulation to ensure that the statement of the rule is jointly understood and is consistent with their programs. The Administrator welcomes comments on all aspects of the proposed regulation, including economic and technological issues.

This regulation will be reviewed five years from the date of promulgation. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, and improvements in emission control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required under the EPA sunset policy for reporting requirements in regulations.

Dated: December 12, 1980.

Douglas M. Costle,
Administrator.

It is proposed that Part 61 of Chapter I, Title 40 of the *Code of Federal Regulations* be amended by adding a new Subpart as follows:

Subpart I—National Emission Standard for Benzene Emissions From Ethylbenzene/Styrene Plants

Sec.
61.100 Applicability and designation of source.
61.101 Definitions.
61.102 Emission standard and compliance provisions.
61.103 Excess emissions reports.
61.104 Emission test and procedures.
61.105 Emission monitoring.
61.106 Recordkeeping.

Authority: Sec. 112, 114, 301(a) of the Clean Air Act as amended (42 U.S.C. 7413, 7414, 7601(a)), and additional authority as noted below.

Subpart I—National Emission Standard for Benzene Emissions From Ethylbenzene/Styrene Plants

§ 61.100 Applicability and designation of source.

This subpart applies to each integrated chemical process producing either ethylbenzene from benzene or styrene from ethylbenzene, and containing one or more of the following equipment: (a) Alkylation reactor section, (b) ethylbenzene hydroperoxidation reactor, or (c) hydrogen separation system.

§ 61.101 Definitions.

The terms used in this subpart are defined in the Clean Air Act, in § 61.02, or in this section as follows:

"Alkylation reactor section" means any equipment or combination of equipment in which benzene is reacted with ethylene to produce ethylbenzene, in which the reactor catalyst is neutralized or separated from reaction products and impurities, or in which diethylbenzene and polyethylbenzene are catalytically transformed to ethylbenzene and by-products.

"Atmospheric column" means each distillation column which operates at atmospheric pressure.

"Continuous monitoring system" means the total equipment used to sample, to analyze, and to provide a permanent record of emissions or process parameters.

"Dehydrogenation reactor" means a reactor in which ethylbenzene is catalytically dehydrogenated in the presence of steam to produce styrene and by-products.

"Distillation column" means a vessel in which a vapor is produced by heating a liquid, with subsequent collection and condensation of the vapors into liquids for the purpose of concentration or purification.

"Ethylbenzene hydroperoxidation reactor" means any equipment or combination of equipment in which ethylbenzene is oxidized with air or oxygen to produce ethylbenzene hydroperoxide.

"Hydrogen separation system" means the combination of equipment in which the crude styrene, unreacted ethylbenzene, and condensed steam is separated from the hydrogen-rich gas stream exiting the ethylbenzene dehydrogenation reactor.

"Malfunction" means any sudden and unavoidable failure of process or air pollution control equipment. A failure of process or air pollution control equipment caused entirely or in part by design deficiencies, poor maintenance, careless operation, or other preventable equipment breakdown shall not be considered a malfunction.

"Natural gas ejector" means a device using a nozzel and a natural gas or nitrogen-driving fluid to increase process vent stream pressure.

"Pressure column" means each distillation column which operates at greater than atmospheric pressure.

"Process vent stream" means any benzene containing continuous gas stream being released or having the potential of being released to the atmophere from each of the following equipment: (1) Alkylation reactor section; (2) atmospheric or pressure column; (3) hydrogen separation system; (4) vacuum-producing device.

"Shutdown" means the cessation of operation to ambient temperature of the (1) entire source as designated in §61.100; (2) alkylation reactor section; or (3) dehydrogenation reactor.

"Smokeless flare" means a flare which produces visible emissions for no more than five minutes within any two-hours period.

"Startup" means the commencing in operation from ambient temperature of the (1) entire source as designated in § 61.100; (2) alkylation reactor section; or (3) dehydrogenation reactor.

"Vacuum-producing device" means each devise which produces an absolute pressure less than atmospheric on any distillation column.

§ 61.102 Emissions standard and compliance provisions.

(a) No owner or operator subject to the provisions of this subpart shall discharge into the atmosphere from a source a process vent stream or combination of process vent streams containing in excess of five parts per million by volume (ppmv) of benzene on a dry basis corrected to three percent oxygen over a time-weight average of three hours.

(b) The emission limit specified in paragraph (a) of this section shall not apply during—(1) malfunctions; (2) startup; or (3) shutdown. During startup, shutdown, and malfunctions, the owner or operator of each source shall combust all emissions by one or more smokeless flares.

(c) The owner or operator of each source shall maintain and operate the source, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing benzene emissions. A determination whether acceptable operating and maintenance procedures are being use will be based on information supplied to the Administrator, which may include but is not limited to monitoring results, review of operating and maintenance procedures, inspection of the source, and review of records.

(d) Upon written application from an owner or operator, the Administrator may approve use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing benzene emissions during startup, shutdown, or malfunction. Owners or operators requesting approval by the Administrator for use of equivalent means for reducing excess emissions shall submit, along with their request, data or calculations supporting their contention that the alternate means would reduce the emissions by an equivalent amount.

§ 61.103 Excess emissions reports.

(a) The owners or operators of each source must comply with the reporting requirements specified in paragraphs (b) and (c) of this section after the emission test required under § 61.104(a).

(b) The owner or operator shall notify the Administrator in writing 30 days in advance of each anticipated startup and shutdown and shall provide an estimate of the anticipated duration of each startup and shutdown.

(c) The owner or operator shall report to the Administrator each occurrence of excess emissions as defined in paragraphs (c) (1) and (2) of this section except for those during startup or shutdown, within ten days of each occurrence.

(1) For sources using a boiler or process heater as the air pollution control device, excess emissions means any occurrence of emissions exceeding the emissions limit specified in § 61.102(a), as indicated by any of the following: (i) Oxygen flow levels, as determined by any flue gas oxygen monitor, below 1.5 percent for a three-hour average.

(ii) Temperatures, as indicated by any firebox temperature monitor, more than 100°F below that registered in the emission test for a three-hour average.

(iii) A flow of zero registered by any flow meter on a compressor or natural gas ejector for a three-hour period.

(iv) Two or more weekly visual checks within a 90-day period that determine if any process vent stream is not being routed to the boiler.

(2) For sources using air pollution control devices other than a boiler or process heater, excess emissions means any occurrence of emissions exceeding the emissions limit specified in § 61.102(a), as indicated by the following: (i) A continuous monitoring system using a gas chromatograph with

a flame ionization detector for a three-hour average.

(ii) A flow of zero registered by any flow meter on a process vent stream or combination of process vent streams for a three-hour period.

(iii) Two or more weekly visual checks within a 90-day period that determine if any process vent stream is not being routed to the control device.

(d) The owner or operator shall submit the following information as a minimum in the report required under paragraph (c) of this section: (1) The identity of the process vent streams where the excess emissions occurred.

(2) Continuous monitoring and operational data which indicated the excess emissions.

(3) The cause, description, and duration of the excess emissions.

(4) A statement whether or not the owner or operator of the source believes that a malfunction has occurred.

(e) If the owner or operator of a source states that a malfunction has occurred, he or she also shall submit the following information as a minimum in the report required under paragraph (c) of the section: (1) The steps taken to remedy the malfunction and the steps taken or planned to prevent a recurrence of the malfunction.

(2) Documentation that the air pollution control equipment, process equipment, or processes were at all times maintained and operated, to the maximum extent practicable, in a manner consistent with good practice for minimizing emissions and were designed in accordance with good engineering practices.

(f) The owner or operator of each source shall submit reports by certified mail to the Administrator and shall indicate that the reports are being submitted in accordance with § 61.103.

§ 61.104 Emission test and procedures.

(a) Unless a waiver of emission testing is obtained under § 61.13, the owner or operator shall test emissions from each process vent stream discharged to the atmosphere from the source—

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source, initial startup of which occurs after the effective date.

(b) The owner or operator shall provide the Administrator 30 days prior notice of the emission test to afford the Administrator the opportunity to have an observer present.

(c) Each emission test must be conducted while the equipment being tested is operating at the maximum rate at which the equipment will be operated.

(d) Each sample must be analyzed within 24 hours of sample collection. Emissions must be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Administrator by a registered letter dispatched before the close of the next business day following the determination.

(e) The owner or operator of each source shall use the following test methods to determine compliance with the numerical emission limit prescribed in § 61.102 unless the Administrator has approved an application requesting the use of an alternative or equivalent method. If the Administrator finds reasonable grounds to dispute the results obtained by an equivalent or alternative method, he may require the use of a reference method. If the results of the reference and equivalent or alternative methods do not agree, the results obtained by the reference method prevail, and the Administrator may notify the owner or operator that approval of the method previously considered to be equivalent or alternative is withdrawn.

(1) Method 3 of Appendix A, Title 40 CFR Part 60 for air dilution correction, based on three percent oxygen in the emission sample.

(2) Method 110 of Appendix B, Title 40 CFR Part 61 for benzene analysis.

(f) Each emission test must consist of three runs. One sample containing a minimum volume of 50 liters corrected to standard condition must be collected for each run. For the purpose of determining emissions, the average of the results from all three runs is to apply. The average must be computed on a time-weight basis.

(g) The sampling time for each run must be a minimum of one hour.

(h) The sampling site must be at least two stack or duct diameters downstream and one-half diameter upstream from any flow disturbance such as a bend, expansion, contraction, or visible flame. The sampling point in the duct must be at the centroid of the cross section. The sample must be extracted at a rate proportional to the gas velocity at the sampling point. For a rectangular cross section an equivalent diameter must be determined from the following equation:

equivalent diameter = 2(length)(width)/length + width

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 61.105 Emissions monitoring.

(a) The owner or operator of each source using a boiler or process heater as the air pollution control device shall install and continuously operate the following equipment: (1) In the exhaust flue of each boiler or process heater receiving a process vent stream, a flue gas oxygen monitor with a strip chart recorder.

(2) Prior to any convective heat transfer surfaces in the firebox, a continuous firebox temperature monitor with a strip chart recorder.

(3) At each compressor and at each suction point of each natural gas ejector handling a process vent stream, a flow meter with a strip chart recorder.

(b) The owner or operator of each source, except those specified in paragraph (a) of this section shall install and continuously operate—

(1) A continuous monitor system with a flame ionization detector which monitors the concentration of benzene emissions discharged to the atmosphere from each process vent stream or combination of process vent streams; and

(2) At each compressor and at each suction point of each natural gas ejector handling a process vent stream, a flow meter with a strip chart recorder.

(c) For the monitoring equipment specified in paragraphs (a) and (b) of this section, the following specifications shall apply: (1) Each flue gas oxygen monitor shall—

(i) Be accurate to ±5 percent of the normal operating range;

(ii) Be calibrated weekly using either air, or a prepared cylinder oxygen standard that is analyzed and certified by the manufacturer to be accurate within ±2 percent, and that has a maximum shelf life recommended by the manufacturer for each cylinder so that the concentration does not change more than ±5 percent from the certified value; and

(iii) Have a sampling location at least two stack or duct diameters downstream and one-half stack or duct diameters upstream from any flow disturbance. For a rectangular cross section, the equivalent diameter shall be determined by:

equivalent diameter = 2 (length)(width)/(length) + (width)

The sampling point in the stack or duct shall be at the centroid of the cross section.

(2) Each firebox temperature monitor shall be installed, operated, calibrated, and maintained according to the manufacturer's specifications and shall have an accuracy of ±2 percent over the normal operating range.

(3) Each flow meter shall be installed, operated, calibrated, and maintained according to the manufacturer's specifications and shall have an accuracy of ±5 percent over the normal operating range.

(4) Each continuous monitoring system shall—

(i) Be a device that obtains process vent stream samples from one or more emission points on a continuous, sequential basis and analyzes the samples for benzene with gas chromatography or, if the organics measured are benzene only, with infrared spectrophotometry, and a flame ionization detector;

(ii) Complete a minimum of one cycle of operation (sampling, analyzing, and data recording) at each source in each successive one-hour period;

(iii) Be verified for operational status by completing the manufacturer's written requirements or recommendations for checking the operation or calibration of the device; and

(iv) Be calibrated by using a standard benzene mixture equal to five ppmv, prepared using the procedures given in section 7 of Method 110, or by using cylinder standards conforming to the requirements of paragraph 5.2.3 of Method 110. A daily zero check shall be performed for each continuous monitoring system using a zero gas with benzene concentration less than 0.1 ppm by volume.

(d) The owner or operator of each source shall visually check each process vent stream weekly to determine if each stream is being sent to the air pollution control device and keep a log, signed by the owner or operator, of each observation.

(e) The owner or operator of each source shall install and operate all monitoring equipment before conducting the emission test under § 61.104.

(f) During any emission tests required under § 61.104 or at such other times required by the Administrator under section 114 of the Act, the owner or operator of each source shall furnish the Administrator a written report of the measurements made by the continuous monitoring system during the emission test within 60 days of the test.

(g) After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements of this part.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 61.106 Recordkeeping.

(a) The owner or operator of each source which uses a boiler or process heater as the air pollution control device shall keep records of the following information: (1) All oxygen level measurements from each flue gas oxygen monitor.

(2) All temperature measurements from each firebox temperature monitor.

(3) All flow rate measurements from each compressor or natural gas ejector flow meter.

(4) All visual checks for each process vent stream.

(5) All emission test results and other data needed to determine emissions as specified in § 61.104.

(b) The owner or operator of each source, except those specified in paragraph (a), shall keep records of the following information: (1) All benzene concentration measurements of the exhaust gas by the monitor specified in § 61.105(b)(1).

(2) The procedures used for converting the measured benzene concentrations to a dry basis, and data that demonstrates that such procedures produce accurate results.

(3) All flow rate measurements from each compressor or natural gas ejector flow meter.

(4) All visual checks for each process vent stream.

(5) All emission test results and other data needed to determine emissions as specified in § 61.104.

(c) Each owner or operator shall keep the records specified in paragraphs (a) and (b) of this section at the source and make them available for inspection by the Administrator for a minimum of two years.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

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Federal Register / Vol. 46, No. 19 / Thursday, January 29, 1981 / Proposed Rules

40 CFR Part 61

[AD-FRL-1740-8]

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Ethylbenzene/Styrene Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amended notice of public hearing and extension of public comment period.

SUMMARY: The public hearing has been postponed 47 days and the end of the public comment period extended 54 days for the proposed national emission standard for benzene emissions from ethylbenzene/styrene plants in response to a request from Chemical Manufacturers Association. This request expressed the need to complete their own exposure modeling and technical and economic analyses in order to evaluate EPA's data base and to provide additional information.

DATES: Written comments to be included in the record on the proposed standard must be postmarked no later than April 30, 1981. Notice of intent to present oral testimony at the public hearing must be postmarked no later than March 17, 1981. The public hearing will be held on March 24, 1981. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than April 30, 1981.

ADDRESSES: Comments on the proposed standard should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-49, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

The public hearing will be held at the EPA Administration Building Auditorium, Research Triangle Park, North Carolina, beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

SUPPLEMENTARY INFORMATION: On December 18, 1980, EPA proposed in the Federal Register (45 FR 83448) a national emission standard for benzene emissions from ethylbenzene/styrene plants. In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards. This notice amends the date of the public hearing and extends the end of the public comment period.

Dated: January 23, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 81-3308 Filed 1-28-81; 8:45 am]

Federal Register / Vol. 46, No. 86 / Tuesday, May 5, 1981 / Proposed Rules

40 CFR Part 61

[AD-FRL-1818-6]

National Emission Standards for Hazardous Air Pollutants: Benzene Emissions From Ethylbenzene/Styrene Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule; extension of public comment period.

SUMMARY: The end of the public comment period has been extended 32 days, from April 30 to June 1, 1981, for the proposed national emission standard for benzene emissions from ethylbenzene/styrene plants in response to a request from Chemical Manufacturers Association. This request expressed the need for additional time to gather data and provide information requested by EPA at the March 24, 1981, public hearing.

DATES: Written comments to be included in the record on the proposed standard must be postmarked no later than June 1, 1981.

ADDRESSES: Comments on the proposed standard should be submitted (in duplicate if possible) to: Central Docket Station (A-130), Attention: Docket Number A-79-49, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: On December 18, 1980, EPA proposed in the **Federal Register** (45 FR 83448) a national emission standard for benzene emissions from ethylbenzene/styrene plants. In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards.

On January 29, 1981, EPA published in the **Federal Register** (46 FR 9660) an amended notice of public hearing and extension of public comment period. In the amended notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards. This notice extends the end of the public comment period.

Dated: April 28, 1971.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-13636 Filed 5-4-81; 8:45 am]

ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

BENZENE FUGITIVE EMISSIONS

SUBPART J

40 CFR Part 61

[AD-FRL 1610-3]

National Emission Standard for Hazardous Air Pollutants; Benzene Fugitive Emissions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: The proposed standard would limit benzene emissions from new and existing fugitive emission sources containing 10 or more percent by weight benzene in the petroleum refining and chemical manufacturing industries. The proposed standard would allow no detectable emissions due to leaks from safety/relief valves and product accumulator vessels; would require a leak detection and repair program for pipeline valves and existing pumps and compressors; and would require certain equipment for new pumps, new compressors, sampling connections, and open-ended valves.

The proposed standard implements the Clean Air Act and results from the Administrator's determination of June 8, 1977, that benzene presents a significant carcinogenic risk to human health and is, therefore, a hazardous air pollutant. The intent of the proposed standard is to protect the public health with an ample margin of safety.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standard for benzene fugitive emissions.

DATES: *Comments:* Comments must be received on or before April 6, 1981.

Public Hearing. A public hearing will be held on March 4, 1981 beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony should contact EPA at least one week before the hearing.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate, if possible) to: Central Docket Section (A-130), Attention: Docket No. A-79-27, U.S. Environmental Protection Agency, 401 M Street , S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at the EPA administration Bldg auditorium, Research Triangle Park, North Carolina. Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

Background Information Document. The background information document for the proposed standard is contained in the docket and may be obtained from the U.S. EPA library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Benzene Fugitive Emissions—Background Information for Proposed Standard (EPA-450/3-80-032a).* Other related documents which can be obtained from the same location include *Assessment of Health Effects of Benzene Germane to Low Level Exposures* (EPA-600/1-78-061); *Assessment of Human Exposures to Atmospheric Benzene* (EPA-450/3-78-031); and *Population Risk to Ambient Benzene Exposures: Final Report of the Carcinogen Assessment Group* (EPA-450/5-80-004).

Docket. Docket No. A-79-27, containing supporting information used in developing the proposed standard, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, Room 2903B, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. Supplementary information on the regulation of benzene emissions can be obtained from the Maleic Anhydride Docket No. OAQPS-79-3, which is available for public review at EPA's Central Docket Section. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Ms. Susan R. Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: Notice is hereby given that under the authority of Section 112(b)(1)(B) of the Clean Air Act the Administrator is proposing a national emission standard for benzene fugitive emissions. Although the proposed EPA *Policy and Procedures for Identifying, Assessing, and Regulating*

Airborne Substances Posing a Risk of Cancer (see 44 FR 58642) is not final, this proposed standard for benzene fugitive emissions has been developed consistent with the proposed EPA policy and procedures. As prescribed in Section 112(b)(1)(A) of the Act, the proposal of this standard was preceded by the Administrator's determination that benzene is a hazardous air pollutant as defined in Section 112(a)(1) of the Act. Accordingly, the Administrator revised the list of hazardous air pollutants on June 8, 1977, by adding benzene (42 FR 29332).

A background information document has been prepared that contains information on the potroleum refining and chemical manufacturing industries, the available control technologies for benzene fugitive emissions, and an analysis of the environmental, energy, economic, and inflationary impacts of regulatory alternatives. Information of the health effects of benzene is contained in other documents prepared by or for EPA. These documents can be obtained as indicated in the ADDRESSES section of this preamble.

Proposed Standard

The proposed standard would apply to new and existing pumps, pipeline valves, compressors, safety/relief valves, open-ended valves, sampling connections, pipeline flanges, and product accumulator vessels in benzene service at petroleum refineries and organic chemical manufacturing plants (excluding coke-oven by-product plants). Equipment components in benzene service are those containing materials having a benzene concentration of 10 or more percent by weight.

The proposed standard would limit leaks from safety/relief valves and product accumulator vessels to "no detectable emissions," that is, emissions having a concentration less than 200 parts per million (ppm) by volume above a background concentration as measured by proposed Reference Method 21 (40 CFR Part 60, Appendix A). Proposed Reference Method 21 measures organic chemicals, including benzene, but the method is not benzene-specific. Leaks from safety/relief valves during emergency conditions would be allowed but would be returned to no detectable emissions within five days of the emergency conditions.

The proposed standard would require that pipeline valves, existing pumps, and existing compressors in benzene service be monitored monthly for the detection of leaks by proposed Reference Method 21. However, valves that are found not to be leaking for two successive months could be monitored quarterly until a leak is detected. The proposed standard would require that any valve, existing pump, or existing compressor with a concentration at or above 10,000 ppm above background as measured by proposed Reference Method 21 be repaired within 15 days, except when repair would require a process unit shutdown. Repair means that the measured concentration is below 10,000 ppm. An initial attempt to repair such a leak would have to be made within 5 calendar days after the leak is detected. Valves, existing pumps, and existing compressors that can achieve a no detectable emission level, such as sealed bellows valves, would be exempted from monthly monitoring, but would have to be monitored on an annual basis to verify the no detectable emission level.

The proposed standard provides two alternative standards for pipeline valves in benzene service (i.e., containing 10 or more percent by weight benzene). After implementing the required leak detection and repair program (monthly monitoring) for one year, a plant owner or operator may request to use one of two alternative standards. The first alternative standard would be an allowable percentage of valves leaking. The second alternative standard would be a different leak detection and repair program. For this alternative standard, a plant owner or operator must demonstrate that the alternative leak detection and repair program achieves a percentage of valves leaking comparable to the required program. In either case, the alternative standard would be based on data collected during a 1-year implementation of the required leak detection and repair program. After a plant owner or operator requests the use of an alternative standard for valves, the Administrator would approve or disapprove the request within 90 days.

Additionally, the proposed standard would require that new pumps in benzene service use dual mechanical seal systems with a barrier fluid. In addition to mechanical seals, new compressors in benzene service would also be required to utilize a barrier fluid system. Degassing vents from barrier fluid systems would be required to be connected to a control device (e.g., an enclosed combustion device) by a closed vent system, and benzene concentration in the barrier fluid would be limited to less than 10 percent by weight. In addition, sensing devices would be required in order to detect failure of the seal systems. Pumps or compressors that can achieve no detectable emissions as measured by proposed Reference Method 21, such as canned motor pumps, diaphragm pumps, and magnetically coupled pumps, would be allowed but would be monitored on an annual basis to verify the no detectable emissions level.

Closed-loop sampling would be required by the proposed standard. The standard would require that material purged from sampling connections be returned to the process or collected in a closed disposal system without emissions to atmosphere. In-situ sampling would be excluded altogether from the proposed standard.

The proposed standard would require open-ended valves to be sealed with a cap, blind, plug, or second valve. The cap or other device could be removed or opened only when the open-ended valve is placed into service.

Sources excluded from routine monitoring and equipment requirements of the proposed standard include safety/relief valves in liquid service and flanges. If, however, leaks are visually or audibly detected from any source in benzene service, leak detection and repair requirements similar to those for pipeline valves would apply.

Compliance with the proposed standard would be assessed through review of records and reports which would document implementation of the requirements. On a quarterly basis, the owner or operator would report the number of leaks detected and repaired during the quarter. The owner or operator would also submit quarterly a signed statement stating whether provisions of the standard had been met.

Any owner or operator of a source designated by the proposed standard could request that the Administrator determine the equivalence of any alternative means of emission limitation to the equipment, design, operational and work practice requirements of the proposed standard. Upon receiving a request for determination of equivalence, the Administrator would provide an opportunity for public hearing. After such a hearing, the Administrator would make a decision and publish the decision in the **Federal Register.**

Summary of Environmental, Energy, and Economic Impacts

The proposed standard would reduce benzene fugitive emissions for existing petroleum refineries and chemical manufacturing units from about 8,300 megagrams per year to about 2,200 megagrams per year. As a result of this emission reduction, the proposed standard would reduce the estimated maximum lifetime risk for the most exposed population from a range of 1.7×10^{-4} to $\times 10^{-3}$ at current controls, to a range of 4.6×10^{-5} to 32×10^{-5}, and would reduce the estimated incidence of leukemia deaths per year from new and existing plant exposure in the fifth year from a range of 0.21 to 1.4 at current controls, to a range of 0.6 to 0.4.

No significant adverse impacts to air quality, water quality, solid waste, energy, or noise are expected as a result of implementing the proposed standard for the existing industry. In fact, benefits to air and water quality would result because the controls utilized in implementing the standard would also reduce emissions of other potentially toxic hydrocarbons and because leak control techniques would reduce the amount of benzene and other organic compounds entering wastewater systems. Also, a positive energy benefit would result because leak control techniques increase conservation of process materials and thereby reduce the energy required to produce these materials.

The proposed standard is expected to affect about 250 existing petroleum refining and chemical manufacturing units. These units contain equipment that are assembled to produce benzene, benzene derivatives, or benzene-containing chemicals as intermediates or final products. The proposed standard would increase annualized costs to the existing petroleum refining and chemical manufacturing industries by about $2.1 million per year. In addition, the proposed standard would require a capital cost of $9.7 million. The increase in operating costs could be expected to increase the average cost of benzene derivatives by about 0.13 percent. There would be no plant closures or loss of employment as a result of implementing the standard.

The proposed standard would affect an estimated 70 new petroleum refining and organic chemical manufacturing units by 1985. The proposed standard would reduce benzene fugitive emissions from these new units from a possible level of 2,500 megagrams per year to 500 megagrams per year. The proposed standard for new facilities through 1985 would require a cumulative capital cost of $6.5 million for new facilities constructed through 1985. The proposed standard would increase annualized cost for new units in these industries by $1.3 million in 1985 and could increase the average cost of products from new facilities by about 0.30 percent.

Background Information on Health Effects of Benzene

The Administrator announced in the June 8, 1977, **Federal Register** (42 FR 29332) his decision to list benzene as a hazardous air pollutant under Section 112 of the Clean Air Act. A public hearing was held on August 21, 1980, to discuss the listing of benzene as a hazardous air pollutant. A hazardous pollutant is defined as an "* * * air pollutant to which no ambient air quality standard is applicable and which * * * may reasonably be anticipated to result in an increase in mortality or an increase in serious, irreversible, or incapacitating, reversible illness."

Numerous occupational studies conducted over the past 50 years have shown that health hazards result from prolonged inhalation exposure to benzene. Since 1900 the scientific and medical communities have recognized benzene as a toxic substance capable of causing acute and chronic effects. Benzene attacks the hematopoietic system, especially the bone marrow, and its toxicity is manifested primarily by alterations in the levels of the formed elements in the circulating blood (red cells, white cells, and platelets). The degree of severity ranges from mild and transient episodes to severe and fatal disorders. The mechanism by which benzene causes toxic effects is still unknown.

These adverse effects on the blood-forming tissues, including leukemia, have been documented in studies of workers in a variety of industries and occupations, including the manufacturing or processing of rubber, shoes, rotogravure, paints, chemicals, and more recently, natural rubber cast film. These studies include single case reports, cross-sectional studies, and retrospective studies of morbidity and mortality among a defined group of workers industrially exposed to benzene.

Based on the entire set of these studies, the Administrator concluded that benzene exposure is causally related to a number of blood disorders, including leukemia.[*] Although the studies which form the basis of this conclusion involve occupational exposure to benzene at higher levels than those found in the ambient air, the Administrator has "made a generic determination that, in view of the existing state of scientific knowledge, prudent public health policy requires that carcinogens be considered for regulatory purposes to pose some finite risk of cancer at any exposure level above zero" (44 FR 58646). Because of the widespread use of benzene, benzene emissions in the ambient air have been determined to result in significant human exposure. For these reasons, exposure to benzene emissions may reasonably be anticipated to result in one or more serious effects that can be expected to lead to an increase in mortality or an increase in serious, irreversible or incapacitating, reversible illness. Therefore, the Administrator concluded that benzene satisfies the definition of hazardous air pollutant under Section 112 of the Clean Air Act.

Rationale for Regulating Benzene Fugitive Emission Sources

Stationary source categories of benzene emissions include fugitive emissions from petroleum refineries and chemical manufacturing plants, the gasoline marketing system, process vents at several types of chemical manufacturing plants, coke-oven by-product plants, and benzene storage and handling facilities. Together, these five categories of stationary benzene emission sources account for national emissions of about 49,000 megagrams of benzene per year.

The first step in establishing standards for benzene was to determine which of the source categories emitting benzene would be regulated. Currently, there are about 130 petroleum refineries and organic chemical plants, which include about 250 units, involved in the production of benzene, benzene derivatives, and benzene-containing materials. These units emit about 8,300 megagrams per year of benzene from fugitive emission sources, or approximately 17 percent of the total benzene emissions from stationary sources. By 1985, 70 additional units are expected to be operating, which would increase the current benzene emission level from about 8,300 megagrams per year to a projected level of 10,800 megagrams of benzene per year if no additional controls are implemented. Although benzene emissions from some new and existing units will be regulated under separate emission standards, those standards would not regulate fugitive emissions of benzene, except fugitive emissions of benzene at coke-oven by-product plants, which will be covered under a separate standard for coke-oven by-product plants.

An estimated 65 million people live within 20 kilometers of the existing 250 units that produce or use benzene in the petroleum refining and chemical manufacturing industries. This estimate is considered an estimate of the population at risk, i.e., the population exposed to ambient concentrations of benzene emissions from fugitive emission sources in those industries. As a result of exposure to these ambient benzene concentrations of benzene, the maximum lifetime risk was estimated to be within a range of 1.7×10^{-4} to 1.2×10^{-3} at current controls. This maximum lifetime risk is defined as the probability of dying of leukemia for an individual within the population at risk who is exposed continuously for 70 years to the highest maximum annual average ambient benzene concentration due to benzene emissions from fugitive emission sources. In addition, the number of people within the population at risk that would die from leukemia due to benzene exposure from fugitive emission sources in the existing industries was estimated to be within the range of 0.15 to 1.14 deaths per year.

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[*] Benene also has been shown to be causally related to various cytopenias (decreased levels of formed element in the circulating blood), aplastic anemia (a non-functioning bone marrow), and potentially inheritable chromosomal aberrations.

Although the operational life of units which may be affected by this proposed standard is difficult to estimate, a 20-year operational life would be common to these industries. Operational lives of 50 years or more may occur particularly in the petroleum refining industry. However, operational lives may be less than 20 years for some chemical manufacturing industries. Consequently, a 20-year operational life is a reasonable estimate. On this basis, the number of deaths estimated to occur over the life of the 250 existing units would range from 3.5 to 23.5.

The ranges presented here include only the uncertainty of estimates made concerning the benzene concentrations to which workers were exposed in the occupational studies of Infante, Aksoy, and Ott, that were the basis for developing the benzene unit risk factor (discussed in Appendix E of "Benzene Fugitive Emissions—Background Information for Proposed Standard," EPA 450/3-800-32a) and are based on a 95 percent confidence interval that assumes the estimated concentrations are within a factor of two.

However, there are several other uncertainties associated with the estimated number of leukemia deaths that are not quantified in these ranges. The number of deaths were calculated based on an extrapolation of leukemia risk associated with a presumably healthy white male cohort of workers to the general population, which includes men, women, children, nonwhites, the aged, and the unhealthy. Uncertainty also occurs in estimating the benzene levels to which people are exposed in the vicinity of petroleum refining and chemical manufacturing plants. Furthermore, leukemia is the only health effect of benzene considered. Additionally, the benefits to the general population of controlling other hydrocarbon emissions from fugitive emission sources in these industries are not quantified. Finally, these estimates do not include the cumulative or synergistic effects of concurrent exposure to benzene and other substances. As a result of these uncertainties, the number of deaths and the maximum lifetime risk calculated around petroleum refining and chemical manufacturing plants could be overestimated. However, and more important, they could just as likely be underestimated for the same reasons.

Based on the magnitude of benzene exposures from emissions from this source category, on the resulting estimated maximum individual risks and estimated incidence of fatal cancers in the exposed population for the life of existing sources in the category, on the projected increase in benzene emissions as a result of new sources, and on consideration of the uncertainties associated with these quantitative risk estimates (including the effects of concurrent exposures to other substances and to other benzene emissions), the Administrator finds that benzene emissions from fugitive emission sources at petroleum refining and chemical plants create a significant risk of cancer and require the establishment of a national emission standard under Section 112.

The Administrator considered the alternative of taking no action to regulate benzene fugitive emissions and relying instead on the OSHA standard for benzene emissions and volatile organic compound (VOC) control under the State Implementation Plans (SIPs). The current OSHA standard stipulates a level of benzene that cannot be exceeded in the work place. Implementation of an emission standard under Section 112 of the Clean Air Act would require direct control of emissions sources by specific limits or other measures. Implementation of an OSHA benzene standard, on the other hand, requires indirect control of the emission sources. That is, OSHA standards require controls only to the extent necessary to reduce worker exposures to levels less than the maximum permissible exposure. Some fugitive emission sources can be located away from the workplace and, hence, may not require control. Therefore, OSHA standards may not require all emission sources to be controlled to a similar extent that an emission standard under Section 112 would require. Also, benzene fugitive emissions controlled to comply with an OSHA standard may be removed from the workplace but still be emitted to atmosphere. Relying on indirect control would be an unreasonable approach to reducing the public risks associated with fugitive emissions of benzene. In contrast, OSHA standards include requirements that regulate worker exposures that emission standards under Section 112 would not cover. Thus, establishment of both standards is appropriate and any redundancy would be superficial. Consequently, the Administrator rejected reliance on OSHA benzene regulations for control of benzene fugitive emissions.

Volatile organic compound emissions, as potential precursors to photochemical oxidant (ozone) formation, are now being regulated under SIPs. The goal of SIP regulations for VOC is to effect statewide compliance with the national ambient air quality standard (NAAQS) for ozone. Regulations under SIPs for reducing VOC emissions could also reduce benzene emissions. However, a particular State may not need to require reduction of VOC fugitive emissions to meet the NAAQS. Consequently, the Administrator rejected reliance on SIPs for control of benzene fugitive emissions.

Standards of performance for fugitive VOC emissions from new petroleum refineries and synthetic organic chemical manufacturing plants are currently being developed under Section 111 of the Clean Air Act. As discussed for SIP regulations, these new source performance standards (NSPS) for VOC emissions will effect some concurrent reductions in benzene emissions. However, since the standards would not apply to existing units and might not require a reduction of VOC emissions to the same extent as may be appropriate for benzene, the Administrator rejected reliance on NSPS for control of benzene emissions.

Thus, after considering the available alternatives, the Administrator determined that Section 112 of the Clean Air Act was the most reliable and expeditious mechanism for the control of benzene fugitive emissions. The Administrator, therefore concluded that a standard for the regulation of benzene fugitive emissions would be developed under the authority of Section 112.

Selection of Designated Sources

Benzene fugitive emissions occur in the petroleum refining and chemical manufacturing industries as a result of the production and use of materials that contain benzene. Benzene-containing materials originate in several ways. In petroleum refineries, benzene is present in numerous process streams. It is present in crude oil in small concentrations and is formed in various refining operations such as pyrolysis and dealkylation. It is also present in many finished refinery products such as gasoline and aromatic products.

In the chemical industry, benzene is present in many processes because it is used in the manufacture of organic chemicals and because it is produced as a by-product in the manufacture of some organic chemicals. Benzene is used as a feedstock in the production of many chemicals, including, but not necessarily limited to, ethylbenzene, cumene, cyclohexane, benzene sulfonic acid, resorcinol, maleic anhydride, chlorobenzene, detergent alkylate, nitrobenzene, and hydroquinone. Additionally, benzene may be produced as a by-product in the manufacture of ethylene and styrene, or it may be produced as a pure product by extraction of mixed aromatics or hydrogenation of toluene.

Organic materials must be moved to and from various process vessels (reactors, distillation columns, etc.) in order to perform the chemical and physical changes required to manufacture a given organic product. These materials are normally moved from vessel to vessel through pipes. The materials are usually driven through the pipes by pumps, and the volume of flow is normally regulated by valves. Pipeline flanges (a method of joining sections of pipe), valves and pumps all require sealing mechanisms such as gaskets and packing glands to prevent leakage of process materials. These sealing mechanisms may develop leaks due to the wear of normal use and, in some cases, may be designed to leak. A small amount of leakage must be allowed for many sealing mechanisms used on rotating shafts in order to provide lubrication for the shaft. Because these sealing mechanisms allow leakage of benzene or benzene-containing materials to atmosphere, they are sources of benzene emissions.

In addition to the potential fugitive emissions resulting from leaks in sealing mechanisms, benzene may also be released during several other operations associated with the processing of organic compounds. Benzene can be released due to leaks in safety/relief valves; from purging, venting, and draining operations; and during product sampling operations. Benzene may also be released from cooling towers, wastewater separators, and process drains due to the leakage of organic materials into these systems.

A decision was made which defines the scope of the proposed standard. Present estimates indicate that 90 percent or more of the total benzene fugitive emissions arise from components which process materials containing 10 or more percent by weight benzene. Thus, the proposed standard would regulate the majority of benzene fugitive emissions if a 10 percent cutoff were applied. In addition, a 10 percent cutoff would eliminate covering trace quantities of benzene, such as those found in crude oil. Therefore, it was decided that the proposed standard would be applied only to fugitive emission sources in benzene service, i.e., those components containing materials of 10 or more percent by weight benzene. However, if information becomes available that indicates that benzene emissions from fugitive emission sources which handle benzene streams below the 10 percent cutoff are greater than presently estimated, the standard could be revised in the future.

An emission standard promulgated under Section 112 of the Clean Air Act covers new and existing stationary sources of a hazardous air pollutant, such as benzene. The coverage of an emission standard depends on the specific definition of stationary source designated for any particular emission standard. A new source includes an existing source which has been modified. In general, an existing source is modified if a change in the source results in increased emissions. New and existing sources covered by Section 112 have different compliance schedules, and, in some cases, new sources may be covered by a more restrictive standard than the standard for existing sources. The designation of fugitive emission sources to be covered by the proposed emission standard was chosen such that the proposed standard would have maximum effectiveness in reducing benzene fugitive emissions from new and existing sources, yet would not cause excessive adverse impacts.

Three possible definitions for the designated sources were considered before making a selection. These were (1) designating all fugitive emission sources within an entire plant site (e.g., an entire refinery or chemical plant) as the source, (2) designating all fugitive emission sources within a process unit (e.g., an alkylation unit or a nitration unit) as a source, and (3) designating each fugitive emission source such as a pump, a valve, or a pipeline flange, as a source.

A plant site consists of all chemical manufacturing and petroleum refining benzene process units under common ownership at the same geographical location. All fugitive emission sources in benzene service at one geographical location could be designated as the source to be covered by the proposed standard. However, entire plant sites are not typically constructed. More typically, a new production unit would be added to an existing site to produce a new product, or larger capacity equipment might be installed to increase production of an existing product. Thus, the effectiveness of the proposed standard would be limited to a standard for existing plant sites or plant sites that would become new plant sites through reconstruction or modification.

If the standards for new and existing fugitive emission sources are identical, then an existing plant site that would become a new source through reconstruction or modification would not be required to comply with any different requirements (except compliance date requirements). If the standard for new sources is more restrictive than the standard for existing sources, then an existing plant site that might become a new source through reconstruction or modification would be required to retrofit additional controls to all fugitive emission sources at that plant site. This could have adverse impacts, especially if the new source standard would require extensive retrofitting. These adverse impacts would be related generally to cost and economic impacts associated with retrofitting an entire plant site. In contrast to these adverse impacts, positive impacts in reducing benzene emissions could be associated with retrofitting an entire plant site.

The designated sources could also be defined as process units. Process units would be considered to be all the fugitive emission sources in benzene service assembled to manufacture benzene, benzene derivatives, or benzene-containing compounds as intermediates or final products. Designating the source as a process unit would have the same impacts as designating the source as a plant site but to a lesser extent. If the standard for new sources is more restrictive than for existing sources, then an existing process unit that might become a new source through reconstruction or modification would be required to retrofit the additional controls. Even though this could have adverse impacts, the impacts would not be as substantial as those if the source were designated as a plant site. In addition, positive emission reduction impacts could result.

Benzene fugitive emission sources could be designated as individual pieces of equipment, such as pumps and valves, that leak benzene or benzene-containing materials, thereby generating benzene emissions to atmosphere. The key factor common to benzene fugitive emissions are directly related to the number of leaking components, but they are not necessarily related to the type of process unit in which the components are found.

If the standard is not different for new and existing fugitive emission sources, then an existing individual component that might become a new source through reconstruction or modification would not be required to comply with any different requirements. However, approval of construction or modification as required in 40 CFR 61.05(a) for each modification or replacement would generally be required. This would require the identification of each component. However, individual components containing at least 10 percent benzene would be identified in such a manner that they would not be confused with components containing less than 10 percent benzene. Thus, the identification of each component for purposes of modification and reconstruction would not be an additional requirement. This procedure would be the same for process units and plant sites.

If the standard for new sources is more restrictive than the standard for existing sources, then existing individual components that might become new sources through reconstruction or modification would be required to retrofit the additional controls to the existing source. In general, this would not happen through modification because most changes in individual pieces of equipment would not increase their emission rates. However, an existing component could become a new source if it were reconstructed or replaced. Cost and economic impacts associated with retrofitting existing sources when they become new sources through modification or reconstruction would be minimized if the sources are designated as individual components. This would occur since replacement of an existing component that becomes a new source would not affect other components. Individual components containing at least 10 percent benzene would be identified in such a manner that they would not be confused with components containing less than 10 percent benzene. In addition, they could be clearly identified as either an existing source or a new source. Identifying existing and new individual components could be difficult but would not be burdensome because both new and existing components would be covered. The only difference would be the requirements of the applicable standard. However, approval of construction or modification for each modification or replacement would generally be required.

The adverse impacts associated with potentially extensive retrofitting of existing plant sites would prohibit the designation of the sources covered by the standard as plant sites. Even though designating the sources covered by the standard as process units would result in less adverse impacts than designating the sources as plant sites, this approach could have adverse impacts. These impacts are minimized by designating the sources as individual components. Thus, because adverse impacts are minimized by designating the sources covered by the standard as individual components, the Administrator has designated individual components as the sources covered by the proposed standard. As a result of this decision, however, the modification and construction approval provisions of 40 CFR Part 61 were reviewed.

Modification is not likely to result in existing sources becoming new sources because, in general, such changes do not increase the emission rate from the source. On the other hand, replacement of a source would essentially be construction of a new source. A definition of reconstruction is being proposed with this standard. The purpose of the application of modification or construction provisions in the General Provisions of 40 CFR Part 61 is to provide EPA with information on new sources and to ensure that new sources comply with the standard. Replacement of existing fugitive emissions sources that comply with the standard for new sources does not warrant a review and subsequent approval of construction. Thus, the Administrator has excluded from approval of construction or modification existing sources that become new sources through reconstruction and that comply with the standard for new sources. However, a notification of the replacement or reconstruction would be reported in the quarterly report that occurs immediately after the reconstruction or modification.

According to the definition of reconstruction which is contained in the proposed standard, there are two criteria which the Administrator will consider in deciding whether a source is reconstructed. The first is that "the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable, entirely new source." The second is that "it is feasible, considering economic impacts and the technological problems associated with retrofit, to meet the applicable standard for new sources set forth in this subpart." The second criterion is only meaningful to portions of the proposed standard which have different requirements for new and existing sources. That is, for any existing source that has the same requirements as a new source, the economic impacts and technological problems associated with retrofit have already been considered. For those existing sources, it has already been decided that they can meet the proposed standard for new sources.

In developing the proposed standard, 13 types of individual process components have been identified as potential sources of benzene fugitive emissions. These components are pumps, pipeline valves, safety/relief valves, open-ended valves, sampling connections, flanges, process drains, compressors, product accumulator vessels, agitators, wastewater separators, cooling towers, and process unit turnarounds.

Four of these types of process components are not included in the proposed standard. At present no data are available that indicate the extent of benzene emissions or emission reduction techniques for wastewater separators, cooling towers, and process unit turnarounds. If information becomes available that indicates the extent of emissions from these sources, standards could be proposed for them in the future. Agitators are not considered to be a significant source of benzene fugitive emissions. Agitated vessels in benzene operations operate at atmospheric pressure; consequently, no leakage is expected at the seal. For pumps, pipeline valves, safety/relief valves, open-ended valves, sampling connections, flanges compressors, and product accumulator vessels, information indicating the extent of benzene emisssions and available control technology are available. Therefore, all except four of these types of equipment have been included in the scope of the proposed standard.

In summary, the sources designated to be covered by the proposed standard are pieces of equipment of the following types that contain fluids (liquid or gas) with a concentration of 10 or more percent by weight benzene: pumps, pipeline valves, safety/relief valves, open-ended valves, sampling connections, pipeline flanges, compressors, and product accumulator vessels.

Selection of Regulatory Alternatives

Benzene fugitive emissions can be reduced by two types of control techniques: (1) leak detection and repair programs, and (2) equipment, design, and operational requirements. Six regulatory alternatives which would achieve different levels of emission reduction where developed by employing various combinations of the available control techniques.

Control Techniques

The leak detection and repair programs included in the various regulatory alternatives consist of two phases. The initial phase involves monitoring potential fugitive emission sources to detect fugitive emissions. After detection of the leak, the fugitive emission source would be repaired or replaced in order to reduce the emissions.

Several leak detection methods were considered in the development of the regulatory alternatives. Methods considered included the use of VOC detectors and soap bubble solutions to locate leaking fugitive emission sources. Different modes of monitoring were also considered. Included were periodic monitoring for leaking fugitive emission sources on an individual component or an area basis and continuous automatic instrument monitoring of background air at multiple sites within a facility. As detailed in the Selection of Test Method section of this preamble, the individual component survey using a portable VOC detector has been selected as the leak detection method for the proposed standard. This method requires that the VOC concentration at the surface of each fugitive emission source be monitored with a portable VOC detector.

The effectiveness of an individual source leak detection program would depend not only on the detection method, but also on other factors. For example, more frequent monitoring would allow more frequent maintenance and a corresponding reduction in fugitive emissions. The selection of the level at which a leak is defined also influences the potential effectiveness of a leak detection and repair program. Other factors such as the length of time allowed between detection and repair of a leak also influence the emission reduction achievable by a leak detection and repair program.

The second phase of a leak detection and repair program consists of repair or replacement of leaking fugitive emission sources. Repair or replacement of a fugitive emission source would be required within a specified period of time after the detection of a VOC concentration equal to or in excess of a predetermined level. These repair and repacement procedures would vary for each fugitive emission source. Fugitive emissions from packed seals on a pump or compressor, for example, could be reduced by tightening the packing gland. However, the packing could deteriorate to a point where further tightening would no longer reduce emissions, but instead would increase the emission rate. At this point, the packing would have to be replaced. Mechanical seals on pumps and compressors would need to be removed for repair. Replacement of these seals would be included in their repair, if necessary.

Most valve leaks can be repaired while the equipment is in service. Most process valves have a packing gland which could be tightened while the valve is in service. Tightening of the packing gland would normally reduce fugitive emissions from a leaking valve. If the packing is old and brittle or if the packing were to be overly tightened, the emission rate could increase. When this occurs, the packing would have to be replaced. Plug valves may be repaired by addition of grease.

Some valves can not be repaired while in service. These valves include control valves, which may be excluded from in-service repair by operating or safety considerations, and block valves, whose removal for repair or replacement might require a process shutdown. Other valves, such as control valves with a manual bypass loop, can be isolated for repair or removal. The repair of a leaking safety/relief valve normally requires that it be removed from service.

Leaks from flanges can often be reduced by tightening the flange bolts. Most flanges can not be isolated from the process to permit replacement of the gasket.

In addition to a leak detection and repair program, certain equipment can be used to reduce fugitive emissions. Possible types of equipment for controlling emissions were considered for the following source types in the development of the regulatory alternatives: pumps, compressors, safety/relief valves, open-ended valves, sampling connections, process drains, and product accumulator vessels.

Fugitive emissions from pumps occur primarily at the pump seal. These emissions could be reduced by elimination of the seal by replacing the pump with a sealless pump, use of an improved seal (e.g., double mechanical seals), or collection and control of the emission with closed vent system.

Because of process condition limitations, sealless pumps are not suitable for all pump applications. However, dual mechanical seals are currently used in many process applications. These seals characteristically include a barrier fluid between the seals. If the pressure in the barrier fluid system is higher than that in the pump seal area, benzene would not leak from the seal. If, however, the pressure in the pump seal area is higher than the barrier fluid pressure, benzene could leak into the barrier fluid and could be emitted to atmosphere through degassing vents the barrier fluid reservoir. Connecting the degassing vents to a control device (enclosed combustion or vapor recovery system) and maintaining the benzene concentration in the barrier fluid below 10 percent by weight could effectively control fugitive emissions originating from the dual mechanical seals. The control efficiency would vary with the condition of the mechanical seals and the type of control device used, but control efficiencies approaching 100 percent can be achieved.

Emissions from compressors also occur primarily at the seal. A closed vent system or replacement of the seal with an improved seal (mechanical) could be used to reduce emissions from compressors. The use of mechanical seals on compressors, connection of the barrier fluid reservoir to a control device (enclosed combustion or vapor recovery system) with a closed vent system, and maintaining the benzene concentration in the barrier fluid below 10 percent by weight could provide control efficiencies approaching 100 percent.

Safety/relief valves may emit benzene fugitive emissions due to the failure of valve seating surfaces, improper reseating after relieving, or process operation near the relief valve set point. Equipment for controlling fugitive emissions from relief valves include closed vent systems connected to a control device or rupture disks upstream of these valves. A closed vent system can be used to transport the relief valve discharge (and fugitive emissions) to a control device. These types of systems are currently used in petroleum refinery and organic chemical process units; however, under certain applications, such as combustion of halogenated compounds, these systems could result in undersirable emissions.

The control efficiency of a closed vent and control device system is mostly dependent on the effectiveness of the control device. For example, a typical flare is about 60 to 90 percent effective for organic compound destruction, and a closed vent system is about 100 percent effective in organic compound capture; thus, the overall efficiency is about 60 to 90 percent.

Rupture disks can be installed upstream of safety/relief valves to prevent fugitive emissions from the valve seat. Unlike a closed vent system, a rupture disk does not require a downstream control device. Therefore, the control efficiency is approximately 100 percent.

When process samples are taken for analysis, obtaining a representative sample requires purging some process fluid through the sample connection. This sample purge would be vented to atmosphere if the fluid is gaseous, and liquid sample purges could be drained onto the ground or into open collection systems where evaporative emissions would result. Fugitive emissions from sampling connections can be reduced by using a closed loop sampling system that eliminates purging of process material.

Fugitive emissions from open-ended valves can be controlled by installing a cap, plug, blind, or second valve on the open end of the valve. These equipment specifications, capping of open-ended valves and closed-loop sampling, represent readily available technologies that have been applied in the industry and exhibit control efficiencies of approximately 100 percent. The actual control efficiencies will depend on site-specific factors.

Fugitive emissions from process drains can be controlled by three methods. First, if drain traps have been installed in the process drain system, then regular flushing of process drains to prevent the build up of benzene-containing organic compounds can effectively reduce fugitive emissions from these sources. Second, sealed drain covers may be installed so that benzene emissions from process drains could not occur. The effectiveness of either of these techniques, however, would depend on the degree of control of other sources in the drain systems such as drain vents and wastewater separators. Thus, another method for controlling fugitive emissions from process drains is to minimize the potential for benzene leakage into the drain system. This is done by minimizing the potential for leakage from other sources such as sampling systems, open-ended valves, and pumps. When the degree of control for these sources is maximized, as discussed above, then their potential for leakage into the drain system will be minimized and the potential for benzene fugitive emissions from the drain system will, likewise, be minimized.

Fugitive emissions from product accumulator vessels (e.g., distillate receiver vessels) occur through the vessel vents. Where a vent is employed, it may discharge directly to atmosphere or indirectly to atmosphere through a vacuum system. Most accumulator vessels in refineries are presently controlled. The vent discharge can be collected by a closed vent system and destroyed by an enclosed combustion device.

Regulatory Alternatives

Six regulatory alternatives of increasing emission reduction efficiency were developed by employing various combinations of the available control techniques. These regulatory alternatives were then analyzed to determine which would serve as the basis of the proposed standard for new and existing sources.

Regulatory Alternative I represents a baseline alternative. The baseline regulatory alternative describes the industry in the absence of new regulations, and it provides the basis for incremental comparison of the impacts of the other regulatory alternatives.

A number of factors influence the baseline emission level. Examination of benzene control programs at individual plants reveals a range of existing control levels. Many plants rely on normal maintenance procedures to control fugitive emissions due to large leaks. Other plants may have developed a leak detection and repair program in response to OSHA regulation requirements, State or local agency regulations, or emission offset provisions. To characterize baseline conditions, however, a general description of the entire industry is desirable, rather than a description of site-specific or geographic-specific conditions. Thus, Regultory Alternative I reflects existing plant maintenance procedures as characterized by emission factors developed from recent studies of fugitive emission sources.

Regulatory Alternative II would require periodic leak detection and repair for most sources and the installation of equipment for other sources and would reduce benzene fugitive emissions by about 60 percent. The requirements of this regulatory alternative are based upon the recommendations of the refinery VOC leak control techniques guideline (CTG) document (EPA-450/2-78-036). Quarterly monitoring for leaks from relief valves, pipeline valves and open-ended valves in gas service, and compressors would be required. Pumps, drains, and valves in liquid service would be required to be monitored annually for leaks. Weekly visual inspections of pump seals would be required; visual detection of a liquid leak would direct that monitoring be initiated to determine if the action level were being exceeded and that the pump seal be subsequently repaired, if necessary. Relief valve monitoring would also be required after over pressure relieving, to detect improper reseating. Finally, open-ended valves would be required to be sealed with a cap, blind, plug, or another valve.

Regulatory Alternative III would provide for more effective control than Regulatory Alternative II by increasing the frequency of leak detection and repair for some sources and requiring the installation of certain equipment for other sources. Regulatory Alternative III would reduce benzene fugitive emissions by about 70 percent. Monthly monitoring for detection of leaks from pumps, compressors, drains, and valves would be required in this regulatory alternative. The purpose of the increased frequency of monitoring is to reduce emissions from residual leaking sources; i.e., those sources that are found leaking and are reparied and then recur before the next inspection, and those sources that begin leaking between inspections.

Regulatory Alternative III would also require the installation of certain equipment. Regulatory Alternative III is based on installation of closed-loop sampling systems; rupture disks on gas service relief valves that vent to atmosphere; accumulator vessel vents tied into a control device; and open-ended valves sealed with a cap, blind, plug, or another valve. Based on a preliminary cost analysis, each of these controls is expected to have similar costs for the amount of benzene emissions reduced.

Regulatory Alternative IV includes equipment that is expected to have greater costs for the amount of benzene emissions reduced than those included in Regulatory Alternative III. Regulatory Alternative IV would reduce benzene fugitive emissions by about 80 percent. Regulatory Alternative IV is based on mechanical seal systems on pumps and compressors, in addition to the other equipment included in Regulatory Alternative III. Diaphragm and sealed-bellows valves were not included because the expected cost for the amount of benzene emissions reduced, based on a preliminary cost analysis, was much greater than for double mechanical seal systems. In addition, drains and valves would be required to be monitored for leaks each month, as in Regulatory Alternative III.

Regulatory Alternative V would require leakless emission control equipment for all designated sources and would reduce benzene fugitive emissions by about 90 percent. In addition to the equipment discussed for Regulatory Alternative IV, this regulatory alternative would require installation of diaphragm or sealed-bellows type valves, and would require drains to be enclosed. Consequently, all designated sources would be controlled to the maximum degree, and leaks would virtually be eliminated from these sources. Equipment would be required to be monitored annually for leaks to ensure continued leakless operation.

Regulatory Alternative VI would require the elimination of all benzene fugitive emissions from the source category. Although the equipment upon which Regulatory Alternative V is based would virtually eliminate benzene emissions from equipment handling greater than 10 weight percent benzene, there would still be some benzene emissions from spills and occasional equipment failure.

The use of substitute feedstocks could eliminate all benzene from some operations; for example, n-butane could be used in the production of maleic anhydride instead of using benzene. However, this approach could not be used for all benzene-consuming processes, as there are no substitutes for benzene in some cases. Therefore, this approach is best considered on a case-by-case process standard basis.

The only approach that could totally eliminate benzene fugitive emissions is the prohibition of all benzene-producing and consuming processes. However, this approach would lead to the shutdown of all refineries and a number of chemical plants because benzene is present in most refinery feedstocks and organic chemical process streams. This approach is considered unreasonable because the economic impacts, although difficult to quantify, would be extremely adverse to the benzene-producing and consuming industries and, consequently, the public.

Selection of the Basis for the Standard—Existing Sources

Selection of a regulatory alternative to serve as the basis for the proposed standard for existing sources involved evaluating the environmental and economic impacts of each alternative discussed in Selection of Regulatory Alternatives. Included for the evaluation of environmental impacts were estimates of air quality, water, noise, and solid waste impacts. Included for the evaluation of economic impacts were estimates of the total capital and annualized costs for implementing each alternative, estimates of the effect on final product prices, and estimates of energy impacts.

After consideration of the environmental, energy, and economic impacts of each alternative, one alternative was selected as best available technology (BAT) for existing sources. After BAT was identified, the estimated risks remaining after application of BAT were examined to determine whether they are unreasonable in view of the health benefits and other impacts that would result if a more stringent option were applied.

To assess the environmental impacts of the regulatory alternatives, existing conditions were first characterized (Regulatory Alternative I). Then incremental impacts were determined from this level of control.

Three model units were chosen to represent average inventories of equipment handling process streams containing greater than 10 weight percent benzene. These model units were developed by analyzing various production operations that are presently known to involve benzene fugitive emissions. The model units are based on the number of pieces of equipment involved in the various production operations because fugitive emissions are proportional to the number of pieces of equipment. Thus, the model units generally reflect process complexity rather than production rate.

Model Unit A represents an average inventory for units involved in the production of ethylbenzene, styrene, cumene, cylohexane, benzene sulfonic acid, resorcinol, benzene from toluene, or maleic anhydride; Model Unit B represents an average inventory for units involved in the extraction of benzene from reformate, or in the production of chlorobenzene or linear alkylbenzene; Model Unit C represents an average inventory for units involved in the production of nitrobenzene, hydroquinone, or benzene by extraction from pyrolysis gasoline. Ethylene production may be represented by either Model Unit A, B, or C, depending on the number of ethylene production units at the plant site; one ethylene unit would be represented by Model Unit A, two or three ethylene units would be represented by Model Unit B, and four or five ethylene units would be represented by Model Unit C. The 1980 industry totals for these model units were estimated to be: Model Unit A, 145 units; Model Unit B, 72 units; Model Unit C, 24 units.

Air Quality Impact

Using baseline emission factors and the equipment inventories developed for the model units, baseline benzene fugitive emissions were determined to be about 19 Mg/year for Model Unit A, 45 Mg/year for Model Unit B, and 97 Mg/year for Model Unit C. These rates multiplied by the number of each model unit present in the existing industry yield a nationwide unregulated total of 8,300 Mg/year.

Regulatory Alternative II would reduce benzene fugitive emissions from the existing industry from 8,300 Mg/year to 3,600 Mg/year, yielding a 57 percent reduction in emissions. Regulatory Alternative III would reduce these emissions to 2,200 Mg/year, yielding a 73 percent reduction. Regulatory Alternative IV would reduce emissions to 1,900 Mg/year, yielding a 77 percent reduction. Regulatory Alternative V would reduce emissions to 900 Mg/year, yielding a 90 percent reduction in emissions from the baseline.

Ambient benzene concentrations attributable to uncontrolled benzene fugitive emissions (Regulatory Alternative I) and those attributable to fugitive emissions reduced to the levels required by Regulatory Alternatives II through V were estimated. The estimated maximum annual average benzene concentration for the facility with the highest expected benzene fugitive emission rate was 13.4 parts per billion by volume (ppbv) at a distance of 0.1 kolometer from the plant. The maximum annual concentrations for this plant under Regulatory Alternatives II through V were 5.9, 3.8, 3.1, and 2.8 ppbv. All of these maximum annual concentrations occurred at 0.1 kilometer from the plant.

Water, Solid Waste, and Noise Impacts

Since none of these regulatory alternatives would require any additional water discharges, there would be no negative impact on water quality. There is potential for a positive benefit to water quality, however, due to decreased amounts of organic materials entering drains, sewers, and wastewater discharges because of better leak control. This benefit would increase with the stringency of the regulatory alternative because each successive regulatory alternative requires additional leak control measures.

There would be minimal impact on solid waste and no impact on noise as a result of implementing any of the regulatory alternatives. The solid wastes associated with the regulatory alternatives are replaced mechanical seals, packing, rupture disks, and valves. The quantities of waste to be disposed are not expected to be significant for any of the regulatory alternatives.

Energy and Economic Impacts

The industry total capital and annualized costs, including recovery credits, can be summarized as follows for Regulatory Alternatives II, III, IV, and V: (1) Regulatory Alternative II would require a total capital investment of $2.9 million and would result in an annualized savings of $25 thousand; (2) Regulatory Alternative III would require a capital investment of $9.7 million and an annualized cost of $2.1 million; (3) Regulatory Alternative IV would require a capital investment of $25.3 million and an annualized cost of $5.5 million; (4) Regulatory Alternative V would require a capital investment of $242 million and an annualized cost of $58.6 million. The annualized costs required to implement Regulatory Alternatives II, III, IV, and V could cause the average price of benzene derivatives to rise by about 0.04, 0.13, 0.37, and 4.1 percent, respectively.

Since the controls required to implement the regulatory alternatives are passive in nature, there would be no negative energy impact. In fact, there would be a slight energy benefit from the conservation of raw materials and products that results from the control of leaks.

In selecting best available technology (BAT) for existing sources, the Administrator reviewed technology to determine the most advanced level of controls adequately demonstrated, considering economic, energy, and environmental impacts, and the technological problems associated with retrofit. First, Regulatory Alternative VI was examined. This regulatory alternative would eliminate benezene fugitive emissions from the industries. However, it would result in closure of a number of industries. Thus, the Administrator did not select Regulatory Alternative VI as the basis for BAT because the closure of these industries would result in extremely adverse economic impacts.

Second, Regulatory Alternative V was examined. This alternative would require the most advanced level of controls without shutdown of any industries. The main difference between this regulatory alternative and the less stringent alternatives is that it would require replacement of existing valves with new leakless valves. Replacing existing valves with leakless valves could result in retrofit problems. For example, in some cases, replacing the valves would increase the pressure drop in the system, and possibly result in reduction in throughputs and/or redesign of the system. Regulatory Alternative V would also result in replacement of some existing pumps with new pumps and replacement of some relief valves with new relief valves, but these replacements would also be required by some of the other alternatives. This regulatory alternative would result in a 7,400 megagram per year reduction in benzene emissions from the baseline for existing plants. Capital cost for this alternative would be $242 million, and the annualized cost would be $58.6 million. Regulatory Alternative V could result in cumulative percent price increases for benzene-derivative products from about 2 percent to about 7 percent. Even if the price increase for benzene production is not passed through to benzene-derivative products, this alternative could still result in price increases of greater than 5 percent for several specialty products made from benzene. Because the implementation of Regulatory Alternative V would result in substantial price increases which could cause adverse economic impacts, the Administrator examined Regulatory Alternative IV before selecting BAT.

Regulatory Alternative IV would require the next most advanced level of controls to the levels for Regulatory Alternative V and would result in a 6,400 megagram per year reduction in benzene emissions. This alternative would require replacement of some equipment. However, this replacement would not be as extensive as that in Regulatory Alternative V, and the technological problems and costs associated with this retrofitting would be reduced accordingly. Regulatory Alternative IV would result in cumulative percent price increases of less than 1 percent for all affected chemicals. Capital costs would be about $25.3 million, and annualized costs would be about $5.5 million.

The Administrator compared the level of controls for Regulatory Alternative V and Regulatory Alternative IV and their economic impacts before selecting BAT. The level of controls for Regulatory Alternative V would result in an additional 1,000 Mg/year emission reduction compared with Regulatory Alternative IV. In contrast to this impact, Regulatory Alternative V would result in much greater economic impacts than Regulatory Alternative IV. The cumulative percent price increases associated with Regulatory Alternative V, which could be as high as 7 percent for some products, could result in significant adverse impacts. Thus, because the additional economic impacts associated with Regulatory Alternative V, in comparison to Regulatory Alternative IV, are grossly disproportionate to the corresponding emission reductions, the Administrator did not select Regulatory Alternative V (90 percent control) as BAT and further evaluated Regulatory Alternative IV.

While Regulatory Alternative IV would not have the same magnitude of economic impacts associated with Regulatory Alternative V, it would still require replacement of some equipment and there could be some retrofit problems associated with this replacement. The Administrator therefore compared the impacts of Regulatory Alternative IV with those of Regulatory Alternative III before selecting BAT.

The only difference between Regulatory Alternatives IV and III is that Regulatory Alternative IV requires replacement of certain mechanical seal systems on pumps and compressors. Some existing pumps can not be retrofitted with dual mechanical seals to meet Regulatory Alternative IV because they do not have pump castings which would adequately house the seal systems. These pumps would have to be replaced. Some of the others which would not have to be replaced would require retrofitting of equipment, such as drive shaft bearings, so that the equipment would operate properly. Regulatory Alternative IV would reduce emissions by 6400 Mg/year. The capital and annualized costs which result from this emission reduction would be $25.3 million and $5.5 million, respectively. Regulatory Alternative III, on the other hand, would reduce emissions by 6100 Mg/year. The capital and annualized costs which would result from this emission reduction would be $9.7 million and $2.1 million per year, respectively.

Because the additional costs associated with nationwide retrofitting and replacing pump and compressor seal systems to meet Regulatory Alternative IV would be exorbitant in light of the resulting emission reductions and the fact that some otherwise properly functioning pumps would have to be replaced, the Administrator did not select Regulatory Alternative IV as BAT and evaluated Regulatory Alternative III.

After examining the costs associated with Regulatory Alternative III the Administrator concluded that its economic impact was reasonable. However, because Regulatory Alternative III could require some replacement of existing equipment, the Administrator compared the impacts of Regulatory Alternative III with those of

Regulatory Alternative II before selecting BAT. Regulatory Alternative III primarily requires monitoring for leaks rather than replacement of existing equipment. However, it does include some requirements for retrofitting equipment, such as placing rupture disks on the process side of relief valves. In some cases, this could result in derating of the relief valve to such an extent that it would need to be replaced by another relief valve. The costs of this replacement were considered in examining Regulatory Alternative III, and are considerably smaller than those associated with replacement of valves and pumps.

Regulatory Alternative III would reduce emissions by 6100 Mg/year and the associated capital and annualized costs would be $9.7 million and $2.1 million, respectively. Regulatory Alternative II would reduce emissions by 4700 Mg/year, and the associated capital cost would be $2.9 million. Regulatory Alternative II would result in an annualized cost credit. After considering the substantially greater emission reduction that would result from implementing Regulatory Alternative III rather than Regulatory Alternative II, the fact that the capital and annualized costs compared with emission reductions in these alternatives which were judged not to be exorbitant, and the lack of significant adverse economic impacts or technological problems associated with retrofit that would result from implementing Regulatory Alternative III, the Administrator selected Regulatory Alternative III as BAT. Thus, Regulatory Alternative III was selected as BAT because it represents the most advanced level of control considering economic, energy, and environmental impacts, and the technological problems associated with retrofit.

After Regulatory Alternative III was selected as BAT for existing sources, the estimated risks remaining after application of BAT were examined to determine whether they were unreasonable in view of the health benefits and costs that would result if a more stringent regulatory alternative were applied. The number of estimated excess leukemia deaths remaining after application of BAT to existing sources is estimated to range from 0.05 to 0.32 per year. After application of BAT to existing sources, the remaining estimated maximum lifetime risk of acquiring leukemia is estimated to range from 4.6×10^{-5} to 32×10^{-5} for the most exposed group.

The Administrator considered one control level beyond BAT for existing sources: 77 percent control, Regulatory Alternative IV. Requiring 77 percent control instead of 73 percent control would reduce the projected incidence of excess leukemia deaths from a range of 0.05 to 0.32 per year to a range of 0.04 to 0.27 per year. As discussed in the Rationale for Regulating Benzene Fugitive Emission Sources section of this preamble, a 20-year operational life is a reasonable estimate for petroleum refining and chemical manufacturing units. On this basis, the number of deaths estimated to occur over the life of the existing units would be reduced from a range of 1.0 to 6.4 (73 percent control) to a range of 0.8 to 5.4 (77 percent control). It would reduce the estimated maximum lifetime risk at the point of maximum exposure caused by fugitive emissions from a range of 4.6×10^{-5} to 32×10^{-5} to a range of 3.9×10^{-5} to 27×10^{-5}. On the other hand, requiring 77 percent control rather than 73 percent control would increase the capital costs from $9.7 to $25.3 million, the total annualized cost from $2.1 to $5.5 million, and the percentage increase in average benzene derivation prices from 0.13 to 0.37.

In view of the relatively small health benefits that would result with the additional costs of requiring 77 percent rather than 73 percent control for benzene fugitive emissions, the Administrator concluded that the risks remaining after application of BAT to existing sources are not unreasonable. Therefore, the Administrator decided not to require more stringent control than BAT for control of fugitive emissions.

Selection of the Basis for the Standard—New Sources

Selection of one of the regulatory alternatives to serve as the basis for the proposed standard for new sources involved the same type of analysis employed for existing sources. As with existing sources, the environmental, energy, and economic impacts of each alternative were considered and based on these considerations, one alternative was selected as BAT. After BAT was identified, the estimated risks remaining after application of BAT were examined to determine whether they were unreasonable in view of the health benefits and costs that would result if a more stringent option were applied.

To determine the incremental environmental, energy, and economic impacts of the regulatory alternative for new sources, an uncontrolled 1985 baseline was used. The baseline was established by estimating the number of new and reconstructed Model Units A, B, and C which would be affected by the proposed standard by 1985. Emission factors were then applied to the Model Units to establish the baseline.

Since each of the Model Units represents average component counts for several different chemical processes, the growth rate (including both new and reconstructed facilities) for each Model Unit was different. The projected growth rates were: Model Unit A, 6 percent per year; Model Unit B, 2 percent per year; Model Unit C, 10 percent per year.

Thus, the total numbers of new units for 1985 were determined to be: Model Unit A, 47 units; Model Unit B, 7 units; Model Unit C, 14 units. Based on these numbers, the 1985 baseline emissions (Regulatory Alternative I) were determined to be 2,500 Mg per year.

Regulatory Alternative II would reduce benzene fugitive emissions from new facilities through 1985 from 2,500 Mg per year to 1,100 Mg per year, yielding a 56 percent reduction in emissions. Regulatory Alternative III would reduce these emissions to 700 Mg per year, yielding a 72 percent reduction. Regulatory Alternative IV would reduce fugitive emissions to 500 Mg per year, yielding a 80 percent reduction. Regulatory Alternative V would reduce emissions to 200 Mg per year, yielding a 92 percent reduction from the baseline.

As in the case for existing sources, the implementation of the regulatory alternatives for new sources would not result in any significant impact on water quality, solid waste, or noise. As previously discussed, there would be slight positive benefits to water quality and energy as a result of increasingly stringent leak control associated with more stringent regulatory alternatives.

The main difference in the considerations of applying the alternatives to new sources was in the capital and annualized costs of implementing the alternatives. The costs of implementing the alternatives are lower for new sources than for existing sources because no retrofitting expenses are involved. Fifth-year industry costs, including recovery credits, can be summarized for new sources as follows: (1) Alternative II would require a total capital investment of $820 thousand and would result in an annualized savings of $70 thousand; (2) Alternative III would require a capital investment of $2.2 million and an annualized cost of $420 thousand; (3) Alternative IV would require a capital investment of $6.5 million and an annualized cost of $1.3 million; (4) Alternative V would require a capital investment of $48.4 million and an annualized cost of $11.4 million.

The annualized costs required to implement Alternatives II, III, IV, and V for new sources could cause the average price of benzene derivatives produced in new plants to rise by about 0.03, 0.10, 0.30, and 3.3 percent, respectively. With regard to the burden imposed by the increased capital costs, the average percentage increase in required capital investment for new plants would be about 0.07 percent for Alternative II, 0.20 percent for Alternative III, 0.50 percent for Alternative IV, and 4.5 percent for Alternative V.

In selecting best available technology (BAT) for new sources, the Administrator reviewed technology to determine the most advanced level of controls adequately demonstrated, considering economic, energy, and environmental impacts. First, Regulatory Alternative VI was examined. This regulatory alternative would eliminate benzene fugitive emissions from the industries. However, it would result in no new construction for a number of industries. Thus, the Administrator did not select Regulatory Alternative VI as the basis for BAT because the lack of growth in these industries would result in adverse economic impacts.

Second, Regulator Alternative V was examined. This alternative would require the most advanced level of controls. This regulatory alternative would result in a 2,300 megagram per year reduction in benzene emissions from the baseline for new plants. Regulatory Alternative V could result in price increases of greater than 4 percent for several specialty products made from benzene, although the average percent price increase for these products would be 3.3 percent. In addition, this alternative would result in industry-wide cumulative percent price increases (i.e., percent price increases that are passed through due to price increases for benzene production and price increases in benzene-derivative production) from 1.5 percent to about 5 percent. Capital cost for this alternative would be $48.4 million, and the annualized cost would be $11.4 million. Because the implementation of Regulatory Alternative V could result in adverse economic impacts, the Administrator examined Regulatory Alternative IV before Selecting BAT.

Regulatory Alternative IV would require the next most advanced level of controls to the levels for Regulatory Alternative V. This alternative would reslt in a 2,000 megagram per year reduction in benzene. Regulatory Alternative IV would result in cumulative percent price increases of less than 1 percent for all affected chemicals. Capital costs would be $6.5 million, and annualized costs would be $1.3 million. This regulatory alternative would not result in adverse economic impacts.

The Administrator considered the level of controls for Regulatory Alternative V and Regulatory Alternative IV and their economic impacts before selecting BAT. The level of controls for Regulatory Alternative V would result in an additional 15 percent emission reduction over the level for Regulatory Alternative IV. In contrast to these impacts, Regulatory Alternative V would result in much greater economic impacts than Regulatory Alternative IV. For example, the capital and annualized costs of Regulatory Alternative V are seven times the cost for Regulatory Alternative IV. In addition, the percent price increases associated with Regulatory Alternative V could result in adverse impacts, whereas those associated with Regulatory Alternative IV would not result in adverse impacts. Thus, becaue the additional emission reduction associated with Regulatory Alternative V in comparison to Regulatory Alternative IV and the economic impacts associated with Regulatory Alternative V and and Regulatory Alternative IV are grossly disproportionate, the Administrator selected Regulatory Alternative IV (77 percent control) as BAT.

The proposed *Policy and Procedures for Identifying, Assessing and Regulating Airborne Substances Posing a Risk of Cancer* includes certain requirements for the siting of new sources (44 FR 58651). These are not implemented in the proposed standard because the details of the procedures have not been formulated. New source siting requirements for fugitive emission sources of benzene may be proposed in the future, but would only apply to new sources constructed, modified, or reconstructed after the proposal data of such siting requirements.

For new sources constructed, modified, or reconstructed in the interim, the Administrator is making a judgment concerning whether the estimated risks remaining after the application of BAT selected for new sources are unreasonable in view of the health benefits and costs, economic impacts, and other impacts that would result if a more stringent alternative were selected. In making this judgment, the approach used was that of estimating the residual risks based on the assumption that population distributions would be similar to those around existing plants and estimates of benzene emissions from new plants. The Administrator decided to use this approach because it seemed the most reasonable approach in the absence of new source siting requirements.

No information is available on the number of people which will be exposed to the emissions from new refining and chemical manufacturing units. They could be located at existing plant sites or entirely new sites. There is no available information to indicate that population distributions around new units will be greater or less than they are for existing units. Therefore, for purposes of estimating deaths due to emissions from new units, it was assumed that the population distributions would be the same as they are for existing units. Therefore, residual deaths were calculated for new sources by using the growth projections for new unit capacity and assuming the population distrubutions were the same new for units as for existing units. Even if new units were added at existing plant sites, this would be accurate assumption since the people living in the vicinity of these plants would be exposed to additional emissions and a linear dose-response model was used to calculate deaths.

In calculating the residual maximum lifetime risk after application of BAT to new sources, it is reasonable to assume that exposures around new facilities would be no greater than they are around existing plant sites. They could be greater if new units were added to the existing plant site associated with the maximum lifetime risk for existing sources. Since there is no information indicating that this will occur, it was assumed that the maximum lifetime risk associated with new sources would be no greater than for existing sources.

After Alternative IV was identified as BAT for new sources, the estimated risks remaining after application of BAT were estimated using the assumption discussed above and used to determine whether they were unreasonable in view of the health benefits and costs that would result if a more stringent option were applied. The number of estimated excess leukemia deaths remaining after application of BAT to new sources is estimated to range from 0.01 to 0.08 per year. The remaining estimated maximum lifetime risk of acquiring leukemia is estimated to range from 3.9×10^{-6} to 27×10^{-5} for the most exposed group living near a source of benzene fugitive emissions.[*]

The Administrator considered one control level beyond BAT for new sources: 90 percent control, Alternative

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[*] This range is the same for new and existing sources because it was assumed that new sources could be built that would have the same maximum potential emissions as the largest existing source.

V. Requiring 90 percent control instead of 77 percent control would reduce the projected incidence of excess leukemia deaths from a range of 0.01 to 0.06 per year to a range of 0.005 to 0.03 per year. It would reduce the estimated maximum lifetime risk at the point of maximum exposure caused by fugitive emissions from a range of 3.9×10^{-5} to 27×10^{-5} to a range of 1.7×10^{-5} to 12×10^{-5}. On the other hand, requiring 90 percent control rather than 77 percent control would increase the capital costs from $6.5 to $48.4 million, the total annualized cost from $1.3 to $11.4 million, and the percentage increase in average benzene derivative prices from 0.30 to 3.3.

In view of the relatively small health benefits that would be gained with the additional costs of requiring 90 percent rather than 77 percent control for benzene fugitive emissions, the Administrator concluded that the risks remaining after application of BAT to new sources are not unreasonable. Therefore, the Administrator decided not to require more stringent control than BAT for fugitive emissions.

New Source Siting

New source siting requirements were included in the proposed policy and procedures for identifying, assessing, and regulating airborne substances posing a risk of cancer (44 FR 58642). The proposed standard does not include provisions to implement these new source siting requirements. However, they may be proposed at a later date. Such a proposal for new source siting provisions would apply to designated sources that become new sources after that proposal date.

Selection of Format for the Proposed Standard

Section 112 of the Clean Air Act requires that an emission standard, or mass emission limitation, be established for control of a hazardous air pollutant unless, in the judgment of the Administrator, it is not feasible to prescribe or enforce such a standard. An emission standard allows for some flexibility in complying with the standard, since any control technique that achieves the standard may be applied.

Section 112(e)(2) defines the following conditions under which it is not feasible to prescribe or enforce an emission standard: (1) if the pollutants can not be emitted through a conveyance designed and constructed to emit or capture the pollutant; or (2) if the application of measurement methodology is not practicable due to technological or economic limitations. Section 112(e)(1) allows that if an emission standard is not feasible to prescribe or enforce, then the Administrator may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof.

An emission standard may not be feasible to prescribe or enforce for benzene fugitive emission sources. Another approach for prescribing a standard would be to specify an allowable leak percentage in terms of a maximum number or percentage of fugitive emission sources that would be allowed to leak. This approach would not establish an emission level on a mass emission rate basis but would have some of the same advantages of an emission standard in that it would allow for flexibility in complying with the standard.

An allowable leak percentage might be defined by utilizing proposed Reference Method 21. However, available test data indicate variability in leak percentages among process units. This variability has precluded the setting of an industry-wide allowable leak percentage that would represent an achievable limit. The allowable leak percentage approach is discussed in Alternative Standard for Pipeline Valves in the next section of this preamble. Using that approach, a plant owner or operator would collect data for at least one year and then commit to an allowable leak percentage on a site-specific basis. The variability in leak percentages would be a factor that an owner of operator would consider before committing to an allowable leak percentage.

The equipment standard format, in general, provides well-documented emissions reductions. Published information is available on applications of various types of equipment; and in some cases, emission test data may be available from existing installations. Compliance would require an initial check to ensure that the equipment had been installed properly and periodic checks to assure that the equipment was continuing to operate properly. However, an inherent disadvantage associated with this type of format is that less site-specific flexibility is provided and innovation may be stymied.

Another format would be work practices. An example of this format would be a program for detecting and repairing leaks. Inspection methods, inspection time intervals, and time allowed for repair would be defined in detailing the work practices. Compliance with a work practice standard would be determined by judging success in implementing the work practices. Some recordkeeping and reporting would be needed to serve as the basis for judging this success.

The proposed standard incorporates these potential regulatory formats. Different formats could be required for different fugitive emission sources, because characteristics of available emission control techniques differ among the fugitive emission sources. In the next section the rationale for selecting a particular format is explained for each type of fugitive emission source. For each fugitive emission source, the feasibility of precribing or enforcing an emission standard is carefully considered. If an emission standard is not feasible, then one of the other formats is selected.

Selection of Emission, Equipment, Work Practice, Design and Operational Standards

As discussed in Selection of Format for the Proposed Standard, Section 112(e) of the Clean Air Act requires that an emission standard be promulgated unless it is not feasible to prescribe or enforce such a standard. Thus, control techniques in Regulatory Alternatives III and IV were evaluated for existing and new sources, respectively to determine if an emission standard could be promulgated.

Safety/Relief Valves

The control technique of applying rupture disks was evaluated as a potential equipment specification for existing and new gas service safety/relief valves under Regulatory Alternatives III and IV, respectively. When the integrity of a rupture disk is maintained, fugitive emissions through the relief valve are eliminated. Properly installed rupture disks will generally maintain their integrity under normal operating conditions unless an overpressure relief situation occurs. After an overpressure relief, replacement of the rupture disk, once again, eliminates fugitive emissions through the safety/relief valve.

Since there is a control technique available that eliminates fugitive emissions from safety/relief valves, it is feasible to prescribe an emission limit of "no detectable emissions," that is, an organic chemical concentration less than 200 ppm above a backgraound concentration as measured by proposed Reference Method 21. The application of a quantitative measurement methodology, such as bagging, to prescribe a no detectable emissions limit would not be feasible due to technological limitations discussed in Selection of Test Method. However, proposed Reference Method 21 can be used to detect leaks of fugitive emissions from safety/relief valves. A safety/relief valve equipped with a properly functioning rupture disk would not leak. The detection of an organic chemical concentration at or above 200 ppm by proposed Reference Method 21 would indicate that the relief valve was leaking. Therefore, it is feasible to prescribe a no detectable emissions limit as the proposed standard for existing and new safety/relief valves in gas service.

The no detectable emissions limit would not apply to discharges through the safety/relief valve during overpressure conditions because the function of the safety/relief valve is to discharge process fluid, thereby reducing dangerous high pressures within the process. The standard would specify, however, that the safety/relief valve be returned to a state of no detectable emissions within five days after such a discharge. It would further require an annual test to verify the no detectable emissions status of the safety/relief valve.

Product Accumulator Vessels

The control technique of connecting existing and new product accumulator vessels to a control device with a closed vent system was evaluated under Regulatory Alternatives III and IV, respectively. A properly designed and installed closed vent system would completely eliminate fugitive emissions from the product accumulator vessel. Since the flow rates of the gaseous emissions from product accumulator vessels are of a much smaller magnitude than those from safety/relief valves, the emissions can be safely disposed of in an enclosed combustion device or can be collected by a vapor recovery system. Specifications for the control device used to dispose of or capture emissions from the closed vent system are included in the proposed standard and are discussed later in this section.

As with safety/relief valves, a control technique is available that eliminates fugitive emissions from the product accumulator vessels. Also, proposed Reference Method 21 can be used to verify that a closed vent system has been designed and installed properly and has eliminated fugitive emissions from a product accumulator vessel. Therefore, since it is feasible to prescribe an emission limit, the proposed standard for product accumulator vessels is no detectable emissions. As with safety/relief valves, the proposed standard requires an initial performance test, using proposed Reference Method 21, to verify that a product accumulator vessel meets the no detectable emissions limit, and annual rechecks to ensure continued operation at no detectable emissions.

Other Fugitive Emission Sources With No Detectable Emissions

As discussed in the following sections, fugitive emission sources other than safety/relief valves and product accumulator vessels can operate with no detectable emissions when leakless equipment is used. For example, canned pumps and diaphragm valves can operate with no detectable emissions. Even though leakless equipment can not be used in all cases, it can comply with a no detectable emissions requirement when it is used. Leakless equipment is at least as effective as work practices and other equipment in reducing benzene emissions, because emissions of benzene from leakless equipment are eliminated. Therefore, the proposed standard considers the application of leakless equipment to be equivalent to the application of work practices and other equipment for fugitive emission sources other than safety/relief valves and product accumulator vessels. As with safety/relief valves, the proposed standard requires an initial performace test, using proposed Reference Method 21, to verify that a piece of leakless equipment meets the no detectable emissions limit, annual rechecks to ensure continued operation at no detectable emissions, and rechecks at the request of the Administrator.

New Pumps

In the analysis of the impacts of Regulatory Alternative IV, dual machanical seal systems were considered as the control technique for new pumps. The evaluation of this control technique first considered the practicability of setting an emission limit. An emission limit standard for pumps is not practicable, however. First, even through new pumps can, in some instances, be equipped to release fugitive emissions into a conveyance mechanism, measurement of these emissions is not practicable due to technological limitations with measuring very low flow, intermittent emission sources. Second, determining emission levels at the pump would require that each pump be bagged as described in the Selection of Test Method section of this preamble. Measurement of an emission level using the bagging method is time consuming, expensive, and impractical. A no detectable emissions limit is not possible to prescribe because data currently available show that pumps equipped with dual mechanical seal systems may not meet such a standard. Thus, because the application of available measurement methods would not be practicable due to technological or economic limitations, an emission standard has not been proposed for new pumps.

Equipment specifications evaluated for new pumps were dual mechanical seal systems (double and tandem), closed vents for the pump seal areas, and sealless pumps. Double mechanical seal systems have two seals in a back-to-back arrangement, with a barrier fluid between the two seals. The barrier fluid is typically maintained at a pressure greater than the pump stuffing box pressure so that any leakage between the seals would be from the barrier fluid to the working fluid; therefore, no benzene would be emitted.

Tandem mechanical seal systems also utilize a barrier fluid; however, the barrier fluid pressure is maintained at a pressure lower than the pump stuffing box pressure. In this arrangement, there is leakage of the working fluid into the barrier fluid. Leakage into the barrier fluid is controlled by either (1) connecting the barrier fluid degassing system to a control device (enclosed combustion or vapor recovery) with a closed vent system or (2) by continuously replacing the fluid with fresh barrier fluid and properly disposing of the contaminated barrier fluid. In either case, the benzene concentration in the barrier fluid must be maintained below 10 percent by weight in order to minimize potential benzene leakage from the outer seal.

Dual mechanical seals utilizing a barrier fluid are the most universally applicable of the options evaluated, and these systems provide a high control efficiency (dependent on the degassing vent control device efficiency). Thus, the Administrator selected the dual mechanical seal and barrier fluid system as the required equipment for new pumps.

Section 112(e) of the Clean Air Act requires that when equipment standards are established, requirements must also be established to ensure the proper operation and maintenance of the equipment. A pressure or level indicator on the barrier fluid system would reveal any catastrophic failure of the inner or outer seal, or of the barrier fluid system. This indicator would be monitored in the control room or equipped with an alarm to signal a failure of the system. These requirements are proposed, therefore, to ensure the proper operation and maintenance of the dual mechanical seal system.

Sealless pumps, such as diaphragm or canned pumps, do not have a potential leak area and, therefore, should achieve approximately 100 percent control. However, sealless pumps may not be suitable for use in some process applications due to throughput, pressure or fluid composition constraints. For these reasons, sealless pumps were not selected under Regulatory Alternative IV. Leakless equipment, such as sealless pumps, are at least equivalent to dual mechanical seal systems, because benzene emissions from leakless equipment are eliminated. Thus, any equipment that complies with a no detectable emissions limit is equivalent to the dual mechanical seal system. As with other leakless equipment, the proposed standard requires an initial performance test, using proposed Reference Method 21, to verify that the piece of leakless equipment meets the no detectable emissions limit, and annual rechecks to ensure continued operation at no detectable emissions.

The seal area of a pump could be completely enclosed, and this enclosed area could be connected to a control device (enclosed combustion or vapor recovery) with a closed vent system. The control efficiency of this arrangement is dependent on the control efficiency of the vapor recovery system or enclosed combustion device. The closed vent system could require a flow-inducing device to transport emissions from the seal area to the control device. Because of safety or operating constraints, enclosure of the pump seal area may not be feasible in all cases. However, there may be pump applications that require pumps that can not be equipped with dual mechanical seals and can not be replaced with a sealless pump, and the enclosed seal area would be the best option for such pumps. Therefore, the Administrator is proposing to allow new pumps to be equipped with enclosed seal areas that are connected to a control device with a closed vent system.

New Compressors

As in the case for new pumps, emission limits for new compressors have not been proposed because the application of available measurement methods would not be practicable due to technological or economic limitations. Like pumps, compressors are not generally designed to release fugitive emissions into a conveyance, and bagging of compressors for emission measurement would be expensive and impractical.

Equipment specifications evaluated for new compressors were (1) sealless compressors; (2) mechanical contact seal systems with barrier fluid systems and, if degassing is necessary, barrier fluid degassing vents connected to a control device; and (3) enclosed compressor seal areas vented to a control device. Mechanical contact seal systems were selected as the basis for Regulatory Alternative IV. The barrier fluid system used in this equipment would be similar to the system described for pumps with dual mechanical seals, although the compressor seal may be mechanical contact, oil film, or another type of seal. Leakage through the seal results in the presence of benzene in the barrier fluid, and this benzene could be emitted from the barrier fluid system. However, this benzene would be collected and directed to a control device (enclosed combustion or vapor recovery system) by a closed vent system that is connected to the barrier fluid system. This approach provides a high control efficiency and is the most applicable effective control technique for new compressors. Thus, the Administrator selected a seal system which includes a barrier fluid system as the required equipment for new compressors.

Section 112(e) of the Clean Air Act requires that when equipment standards are established, requirements must also be established to ensure the proper operation and maintenance of the equipment. A pressure or level indicator on the barrier fluid system would reveal any catastrophic failure of the inner or outer seal, or of the barrier fluid system. This indicator would be monitored in the control room or equipped with an alarm to signal a failure of the system. These requirements are proposed, therefore, to ensure the proper operation and maintenance of the mechanical contact seal system.

Although sealless compressors would achieve approximately 100 percent control, sealless compressors are not readily available in capacities large enough for most process applications and, therefore, have limited use. Consequently, sealless compressors were not considered under Regulatory Alternative IV and were not selected as equipment for the proposed standard. Leakless equipment, such as sealless compressors, are at least equivalent to mechanical contact seal systems, because benzene emissions from leakless equipment are eliminated. Thus, any equipment that complies with a no detectable emissions limit is equivalent to the mechanical contact seal system. As with other leakless equipment, the proposed standard requires an initial performance test, using proposed Reference Method 21, to verify that the piece of leakless equipment meets the no detectable emissions limit, and annual rechecks to ensure continued operation at no detectable emissions.

There are some cases in which seals with barrier fluid systems can not be utilized. For example, for some high pressure applications, reciprocating compressors may be required. Mechanical seals with a barrier fluid system can not be used under all process conditions due to pressure limitations. For those cases in which mechanical contact seals are not technically feasible, enclosure of the seal area would be the best option for new compressors. The enclosed area would be connected to a control device (enclosed combustion or vapor recovery) with a closed vent system. Therefore, the Administrator proposes to allow seal areas to be enclosed and connected to a control device with a closed vent system for new compressors.

Open-Ended Valves

Benzene from open-ended valves occurs due to leakage through the valve seat of a valve which seals the open end from the process fluid. Generally, open-ended valves are not designed to release fugitive emissions to a conveyance, and bagging of these sources for emission measurement would not be practical. A no detectable emissions limit is not feasible to prescribe because benzene could leak through the valve seat and become trapped in the line between the valve and closure. Consequently, benzene could be emitted. Thus, the approach of requiring equipment was examined.

Equipment considered for open-ended valves included improved valve seat technology and closure of the open-end. Improved valve seat technology was not selected because the effectiveness of such technology could be nullified by operating variables such as incomplete closure of the valve by operating personnel. Closure of the open end could be achieved by installing a cap, plug, blind, or a second valve on the open end. The control efficiency associated with these techniques is approximately 100 percent, except when the line is used for a draining or venting operation. Thus, the Administrator is proposing standards that require open-ended valves to be equipped with a cap, plug, blind, or a second valve.

To ensure the proper operation of the equipment, open-ended lines would also be covered by an operational standard. If a second valve is used, the proposed standard would require the upstream valve to be closed first. After the upstream valve is completely closed, the downstream valve must be closed. This operational requirement is necessary in order to prevent trapping process fluid between the two valves, which could result in a situation equivalent to the uncontrolled open-ended valve.

Sampling Connections

When process samples are taken for analysis, it is necessary to purge some process fluid through the sample connection to obtain a representative stream sample. This sample purge would be vented to atmosphere if the fluid was gaseous, and liquid sample purges could be drained onto the ground or into open collection systems where evaporative emissions would result. Generally, sampling connections are not designed to release fugitive emissions to a conveyance, and bagging of these sources for emission measurement would not be practical. A no detectable emissions limit is not feasible to prescribe because no available data indicate that application of any control technique would be able to comply with such a standard at all times.

Closed-loop sampling was considered as the equipment specification for sampling connections. Closed-loop sampling systems eliminate emissions due to purging by either returning the purge materiaal directly to the process or by collecting the purge in a collection system which is not open to atmosphere for recycle or disposal. Thus, the Administrator selected closed-loop sampling systems as the required equipment for sampling connections.

Process Drains

Control by minimizing the potential for benzene leakage into the process drain system was considered for process drains. However, controls are specified for all potential major sources of benzene leakage into process drain systems. Thus, the Administrator did not consider it necessary to specify additional controls for process drains in the proposed standard.

Pipeline Valves, Existing Pumps, and Existing Compressors

Like some of the previously discussed fugitive emission sources, pipeline valves, existing pumps, and existing compressors are generally not designed to release fugitive emissions to a conveyance. Because of the large number and diverse location of valves, existing pumps, and existing compressors, bagging of these sources for emission measurement would not be economical or practical. A no detectable emissions limit can not be prescribed, because, with the control technique specified in Regulatory Alternatives III and IV, pipeline valves, existing pumps, and existing compressors are expected to leak occasionally. However, pipeline valves, existing pumps, and existing compressors that are designed to achieve a no detectable emission limit would be allowed and exempted from other requirements as discussed in the Other Fugitive Emission Sources with No Detectable Emissions section of this preamble.

Work practices consisting of periodic leak detection and repair programs were considered for valves, existing pumps, and existing compressors. Several factors influence the level of emission reduction that can be achieved by a leak detection and repair program. The three main factors are the monitoring interval, leak definition, and repair interval. Training and diligence of personnel conducting the program, repair methods attempted, and other site-specific factors may also influence the level of emission reduction achievable; however, these factors are less quantifiable than the three main factors.

The monitoring interval is the frequency at which individual component monitoring is conducted. The length of time between inspections is best determined by the rate at which new leaks occur and repaired leaks recur. More frequent inspections could then be required for sources which tend to leak more often. Available data that quantify the frequency of occurrence and recurrence of leaks are limited. However, more frequent monitoring would result in greater emission reduction because more frequent monitoring would require earlier leak detection and, therefore, would result in repair of leaks sooner.

Monthly monitoring was considered in Regulatory Alternatives III and IV. Tests indicate that leaks will be found with monthly inspections. Since some time may be required to schedule repair after a leak is detected, monitoring intervals shorter than one month could result in a situation where a detected leak could not be repaired before the next monitoring was required. One month was selected as the required monitoring interval because it would provide the greatest emission reduction potential without imposing difficulties in implementing the leak detection and repair program.

Monthly monitoring of valves to detect leaks is reasonable. However, some valves may leak less frequently than others. One indicator that might predict which valves leak is valve leak history. That is, once a valve leaks, then it may be more likely to leak again than a valve that has not leaked. The Administrator decided to implement the monthly monitoring requirement by focusing on the valves that tend to leak more often. One approach of doing this is to allow an alternative monitoring period for valves found to leak less frequently than others. The Administrator is proposing that leak detection and repair work practices include monthly monitoring for valves unless they are found not to leak for two successive months. If a valve is found not to leak for two successive months, the owner or operator may elect to monitor during the first month of the next quarter and quarterly thereafter until a leak is detected. Whenever a leak is detected, the valve would be monitored once a month until the valve did not leak for two successive months.

The proposed standard for valves is based on the assumption that recurrence is an important factor in predicting valve leaks. This assumption was used to develop a monitoring program that would result in a level of fugitive emission control comparable to that resulting from monthly monitoring. EPA does not intend to propose a monitoring plan that would be comparable to quarterly monitoring.

EPA is currently collecting data concerning the importance of valve leak recurrence. This data should be available for public review before the end of the public comment period. If the data show that recurrence is not a significant contributor to the total number of leaking valves, the proposed program will be reassessed and consideration will be given to returning to strict monthly monitoring.

The leak definition is the concentration observed during monitoring that defines leaking sources that require repair. As discussed in the Selection of Test Method section, the proposed standard would require the use of proposed Reference Method 21 to measure concentrations of organic chemicals at the leak interface. Two primary factors affect the selection of the leak definition. These factors are (1) the percent of total mass emissions which can potentially be controlled by the leak detection/repair program, and (2) the ability to repair the leaking components. The maximum potential emission reduction resulting from various leak definitions can be estimated for valves, pumps, and compressors in benzene service. Estimated emission reduction potentials (i.e., the maximum control efficiency that could be achieved if other contributing factors were 100 percent) are shown in Table 4–2 of the Background Information Document.

As the leak definition decreases, the maximum potential emission reduction increases due to the increasing number of sources that are found to be leaking and are repaired. The overall emission reduction of a leak detection and repair program depends on several factors as noted above. Each of these factors limits the effectiveness of the program. If each of the factors considered in selecting the leak detection and repair program is 90 percent effective, then the overall effectiveness would be about 73 percent. Thus, the most restrictive definition that is reasonable for each factor should be selected. In order to provide the maximum control effectiveness of the leak detection and repair program, the lowest leak definition that is feasible in terms of monitoring and repair-ability should be selected.

Preliminary data from petroleum refineries show that attempting on-line repair at or above a leak definition of 10,000 ppm could result in a few cases where the attempted repair would increase the emission rate. However, these cases do not offset emission reductions achieved by repair. In these cases, more extensive repair effort than tightening or regreasing the packing would be required. These data also show that attempting repair in the 1,000 to 10,000 ppm (low level) range could result more often in individual emission rates with increases after simple repair. If such increases were to occur, the attempted repair of "low level" leaks could result in a lower overall emission reduction at 1,000 ppm than at the 10,000 ppm leak definition. Because the 10,000 ppm leak definition may provide a higher overall emission reduction of benzene fugitive emissions than the 1,000 ppm action level, 10,000 ppm was selected as the leak definition for leak detection monitoring.

The repair interval is the length of time allowed between the detection of a leaking source and repair of the source. As noted above, in order to make the overall program effective, the most restrictive selection for this factor should be chosen. Thus, in order to provide the maximum effectiveness of the leak detection and repair program, the repair interval should require exepeditious reduction of emissions but should allow the owner or operator sufficient time to maintain some degree of flexibility in overall maintenance scheduling.

The length of the repair interval would affect emission reductions achievable by the leak detection and repair program because leaking sources would be allowed to continue to leak for a given length of time. Repair intervals of 1, 5, 10, 30 and 45 days were evaluated. The effect on the maximum emission reduction potential is proportional to the number of days the source is allowed to leak between detection and repair.

A repair interval of one day would cause problems in coordinating activities of personnel involved in leak detection and leak repair and in some instances would not be technically feasible. A repair interval of one day would essentially require repair of each component as soon as the leak was discoverd.

Some valves, pumps, and compressors may not be repairable by simple field maintenance. They may require spare parts or removal from the process for repair. Repair intervals of 5 and 10 days could cause problems in obtaining acceptable repair, especially when removal from the process would be required. However, a 15-day interval provides the owner or operator with sufficient time for flexibility in repair scheduling, and provides time for better determination of methods for isolating pieces of leaking equipment for repair. In general, a 15-day repair interval allows more efficient handling of repair tasks while maintaining an effective reduction in fugitive emissions. Thus, the repair interval selected for proposal in the leak repair program is 15 days. A repair interval of 30 or 45 days was not selected because 15 days is the most restrictive yet feasible selection.

However, the first attempt at repair of a leaking source should be accomplished as soon as practicable after detection of the leak, but no later than five days after discovery. Most repairs can be done quickly, and five days should provide sufficient time to schedule maintenance and repair a leaking valve. Attempting to repair the leak within five days will help to identify the leaks that can not be repaired within the 15-day repair interval. Delay of repair would be allowed for leaks that could not be repaired without a process unit shutdown. These leaks would have to be repaired at the next scheduled unit shutdown.

Some existing pumps and compressors have been built with dual mechanical seal systems like those that would be required for new pumps and compressors. Because these existing pumps and compressors would achieve an emission reduction greater than that associated with the proposed work practices, they would be allowed and, therefore, would be exempted from the required work practices if a plant owner or operator chooses to reduce emissions through the use of the seal system. However, they would be required to comply with the dual mechanical seal system requirements as specified for new pumps and compressors.

Alternative Standard for Pipeline Valves

In an effort to provide more flexibility, two alternative standards are being proposed for pipeline valves in benzene service. Plant owners or operators could elect to comply with one of the alternative standards in order to tailor fugitive emission control programs to their own operations. Before the alternative standard could be considered, however, a plant owner or operator would implement a monthly monitoring program for at least one year. A plant owner or operator then could elect to comply with one of the alternative standards which would be based on information gathered during the 1-year implementation of monthly monitoring.

The first alternative standard would provide an allowable percentage of leaking valves. This type of standard would provide the flexibility of a performance standard by setting a limit which could be achieved by the most efficient and practical methods for a particular operation. As previously pointed out in Selection of Format for the Proposed Standard section of this preamble, an industry-wide allowable leak percentage was not possible for valves because of the variability in valve leak percentages among similar processes within the industry. However, the alternative standard would allow each process unit to comply with an allowable percentage of leaking valves which is determined by valve performance based on monthly monitoring in the leak detection and repair program.

The allowable percentage of leaking valves would be determined by averaging the percentage of valves found leaking in each month of the last six months of monitoring, excluding those which could not be repaired without a process unit shutdown. To this average would be added the additional percentage of leaks which would occur if valves found leaking were monitored monthly and those not found leaking for two successive months were monitored quarterly. The resulting sum would be the performance standard for the percentage of leaking valves that would be allowed at any time. If an owner or operator elected to comply with an allowable percentage of leaking valves, he would be required to meet this alternative standard at any time, even though his allowable percentage would be based on the average performance of a leak detection and repair program. Choosing this alternative standard would allow the possibility of using different monitoring and maintenance programs and substitution of engineering controls at the discretion of the owner or operator. In addition, the alternative standard would eliminate much of the recordkeeping and reporting associated with the proposed standard for pipeline valves.

This alternative would require a minimum of one performance test per year. Additional performance tests could be requested by EPA. If the results of a performance test showed a precentage of leaking valves higher than the allowable limit, the process unit would be in violation. Reporting would consist of submitting performance test results to the Administrator; quarterly reporting would be eliminated for valves.

The second alternative standard would provide for the use of different work practices which would achieve the same level of control as the proposed standard for valves. After performing monthly monitoring for at least a year, the data collected would be used to devise work practices which would achieve the same control as the work practices specified in the proposed standard. Using this approach, an owner or operator could optimize labor and capital costs to achieve the required level of control by varying monitoring intervals or installing valves with lower probabilities of leaking. Quarterly reporting would be required under this alternative as it is under the proposed standard.

An owner or operator would request approval from the Administrator to use either alternative standard for pipeline valves. A request for approval would be accompanied by a description of the standard being selected for compliance and data and calculations supporting the basis for the alternative standard. The Administrator would approve or disapprove the alternative standard within 90 days of the request for approval. A denial from the Administrator would be accompanied by his reasoning for denial. An owner or operator would be required to comply with the proposed work practice standard for pipeline valves until the alternative is approved.

The approach of providing an alternative standard would be reassessed before promulgation of the proposed standard and, if promulgated, would be reviewed at the fifth-year review. At that time, changing, eliminating, or continuing the alternative standard would be considered.

Control Devices

Control devices would be used to dispose of benzene captured in closed vent systems from barrier fluid degassing systems, enclosed pump and compressor seal areas, and product accumulator vessels. In all cases, these control devices would receive streams with low and intermittent flow rates. These control devices may be designed to dispose of organic streams from other sources in the plant; therefore, the benzene streams may contribute a very small portion of the total loading on the control device. For these reasons, and because of technological limitations with measuring very low-flow streams, an emission standard was not proposed for these control devices.

Design requirements were evaluated in order to ensure that appropriate emission reductions would be achieved from control devices used in conjunction with closed vent systems. Enclosed combustion devices and vapor recovery systems were considered in evaluating control device design requirements. Enclosed combustion was specified because open flares may only be 60 percent efficient for benzene destruction in these low flow, intermittent streams. The design requirements specified for enclosed combustion are the attainment of a minimum 760° C for 0.5 seconds. Under these conditions, greater than 95 percent benzene destruction is achieved. Vapor recovery systems may also be used to control benzene from closed vent systems. A controlled efficiency of 95 percent was chosen as the design requirement because it is a reasonable control efficiency achievable for vapor recovery systems such as carbon adsorption or condensation units. These control devices would receive intermittent flows from the fugitive emission sources and, therefore, would require operation only during emissions from these sources. The Administrator is, therefore, proposing that the standard require enclosed combustion devices and vapor recovery systems used as control devices for closed vent systems to be designed for 95 percent benzene emission reduction and operated when emissions from sources covered by the proposed standard are vented to the control device.

Exclusions

Safety/relief valves in liquid service and flanges were excluded from routine monitoring and equipment requirements. However, if leaks from these sources are observed, repair would be required. These sources were excluded from routine monitoring and equipment requirements based on data from petroleum refineries, which is also applicable to the chemical industry. Flanges in refineries have very low emission rates. They contribute 2.2 percent of all emissions, but include 61 percent of the total number of sources. Safety/relief valves in liquid service also have very low emission rates in refineries. They contribute only 0.2 percent in all emissions. Since these types of sources contribute a very small portion of overall emissions, including them in the routine monitoring and equipment requirements was not considered reasonable.

Control Technique and Equipment Failures

Control technique and equipment failures can cause increased emissions from fugitive emission sources. Most control techniques and equipment for fugitive emission sources do not eliminate the possibility of emissions that result from control technique and equipment failures. For example, failure of dual mechanical seal systems does occur and can result in emissions of benzene that would not have otherwise occurred. The requirements included in the proposed standard, however, include provisions for controlling fugitive emissions during these failures. Thus, as discussed below, additional requirements for reducing emissions during control technique and equipment failures were not necessary.

For pipeline valves, existing pumps, and existing compressors, the proposed standard requires periodic leak detection and repair. This practice focuses on locting leaking valves, existing pumps, and existing compressors and requiring their repair. Certain leaking valves, existing pumps, and existing compressors can not be repaired within 15 days without a process unit shutdown. The proposed standard allows delays for repair of these pieces of equipment beyond 15 days and provides for repair of the leaking equipment during a process unit shutdown.

For new pumps, new compressors, open-ended valves, and sampling connections, the proposed standard would require certain equipment. The proposed standard includes provisions to assure the proper operation and maintenance of the equipment and, thus, focuses on detecting equipment failures and requiring their repair.

The proposed standard for safety/relief valves in gas/vapor service would require no detectable emissions except during overpressure releases. Emissions during over-pressure releases do not result from equipment failures, because the function of safety/relief valves is to discharge process fluid to reduce dangerous high pressures within the process. The proposed standard would require a return to no detectable emissions within five days of an emergency episode.

The proposed standard for product accumulator vessels would require no detectable emissions. This requirement could be achieved by properly installing and maintaining a closed vent system to convey the emissions to a convenient but acceptance portion of the process/operation, to a plant fuel-gas sytem connected to a boiler furnace, or to a control device. A closed vent system that is properly installed and maintained will not allow emissions to occur. Therefore, emissions from equipment failures should not occur.

The proposed standard would require control devices to meet certain design requirements and to operate when emissions from fugitive sources are vented to them. Properly designed and operated control devices would not result in control equipment failures that would result in emissions. For example, emissions from new pump or compressor barrier fluid systems can be vented manually to a control device. The emissions, therefore, can be vented when the control device is operating, thus eliminating these emissions during control equipment failures. Increased emissions during control equipment failures should not occur with this requirement because emissions vented to control devices can be regulated so that the device is operating when emissions are vented. Therefore, dual control systems would not be needed to comply with this requirement.

In summary, it was not necessary to consider additional control techniques for reducing emissions during equipment failures because the proposed standard already contains provisions for handling these emissions. During control equipment failures, fugitive emissions collected by closed vent systems can be vented to a control device when it is operating.

Selection of Recordkeeping and Reporting Requirements

Recordkeeping.—Three recordkeeping alternatives were considered in evaluating the amount of recorded information needed to assess compliance with the proposed standard.

The first alternative would be to require no formal recordkeeping. If recorded documentation of the proposed leak detection and repair program were not required, no mechanism would be provided for checking the thoroughness of the industry's efforts to reduce fugitive emissions effectively. Because the effectiveness of the leak detection and repair program is dependent upon the thoroughness of the industry's efforts, this alternative was not chosen as the basis of the recordkeeping requirements.

The second alternative would require recordkeeping to document results of the leak detection and repair program and information relating to equipment specifications. Information would be recorded in sufficient detail to enable owners or operators to demonstrate compliance with the standard and, therefore, provide reasonable assurance of adequate reduction of fugitive emissions. This alternative would require the maintenance of quantitative records of repaired and unrepaired leaking components. This alternative would require only the minimum amount of records of the work practice leak detection and repair program necessary to ensure the effective implementation of the proposed standard.

The third alternative would require recordkeeping of all the information generated by the proposed standard. This information would include, for example, the leak rate (ppm) detected for all components monitored at a given facility. Much of this information would not be necessary to ensure the implementation of the proposed standard.

The second alternative was selected as the basis for the recordkeeping requirements of the proposed standard. This alternative would require the minimum industry resources for providing the necessary records to ensure effective implementation of the proposed standard. This alternative would also provide a basis for efficient reporting.

Specific information pertaining to the leak detection and repair would be recorded. Each source found to be leaking during the first month of a quarter would be identified with readily visible weatherproof identification bearing an I.D. number. The identification could be removed after the source had been repaired and monitored for leaks and repaired as necessary for the next two successive months. A log would be maintained for information pertaining to the leaking sources. The log would contain the instrument and operator identification numbers, the leaking source identification number, the date of detection of the leaking source, the date of the first attempt to repair the leaking source, repair methods applied in the first attempt to repair the source, and the date of final repair. The log would be kept for two years following the survey.

If the leaking component could not be repaired within 15 days, the reasons for unsuccessful repair and the date of anticipated successful repair would be recorded on the leak report form. Once the leaking source was successfully repaired, the date of repair would be recorded on the leak report form. These records would be needed to provide the information necessary to allow enforcement personnel to assess compliance with the work practice standards.

For equipment specifications, records would be maintained of the dates of installation, start-up, control equipment repair, and control equipment modifications. The dates and descriptions of any control equipment failures would also be recorded. These records would be needed to provide information necessary to allow enforcement personnel to assess the effectiveness of implementation and maintenance of equipment standards.

For design standards, records would be maintained of the location and type of equipment to which the standard applies. As an example, if a boiler furnace is used as a benzene emission control device, then the design fuel and air usage rates, the firebox volume, the average firebox temperature and other design specifications would be recorded.

Reporting.—Three alternatives were considered in evaluating the reporting information needed to assess compliance with the proposed standard. These alternatives represent varying levels of enforcement monitoring of the proposed standard. Enforcement personnel would review the reports submitted by industry personnel on the status of implementing the proposed standard. This review procedure reduces the need for in-plant inspections.

The first alternative would include an affidavit testifying that all specified equipment had been installed, that all components had been monitored, and that those with leaks in excess of the action level had been repaired. These requirements would provide less than the minimum information necessary to monitor compliance with the proposed standard. This alternative would not ensure that fugitive emission reductions had been achieved and would not provide a mechanism for checking the thoroughness of the industry's efforts to reduce these emissions. Thus, compliance with the proposed standard would be assessed mainly through in-plant inspections.

The second reporting alternative would require the submittal of information in sufficient detail to ensure the implementation and maintenance of emission and operational standards and of the specified equipment and the leak detection and repair programs as required by the proposed standard. These requirements would stipulate the submittal of quarterly reports. Included in the reports would be a summary of information on the leaking components which had been detected during the quarter. This requirement would provide enforcement personnel with an overview of the repair of leaking components. A statement signed by the plant owner or operator attesting to the validity of the results of the monitoring surveys and instrument calibration procedures would allow enforcement personnel to assess the compliance of facilities with the work practice standards. The report would also attest to the proper application and operation of the equipment required by the proposed standard.

The third reporting alternative would require the submittal of all the information obtained while conducting leak detection and repair programs. This information would include the information reported in the second alternative and, additionally, comprehensive information on all tested components. This reporting alternative would necessitate the reporting of all information included in the recordkeeping requirements and would require more resources than the second alternative.

The second alternative was selected as the reporting rquirement for the proposed standard. This alternative provides sufficient information to review compliance without requiring excessive resources from industry and enforcement personnel. The first alternative was not selected because the compliance with work practice standards and the implementation of equipment standards could not be adequately assessed by enforcement personnel to ensure that reductions in fugitive emissions were achieved. The third reporting alternative was not selected because the additional resources expended by industry and enforcement personnel would not facilitate assessment of compliance with emission, operational, and work practice standards and implementation of equipment standards.

In the proposed standard, quarterly reporting of information pertaining to leaking sources detected but not repaired within 15 days of detection would be required. The necessary information would include the location, I.D. number, reasons for unsuccessful repair and the expected date when repair would be accomplished. The date of successful repair after 15 days of initial detection of the leak would also be reported. In addition, the owner or operator would submit a signed statement with the report certifying that compliance with the requirements has been met. One signed statement would be sufficient to cover all process units at the plant.

Equivalence of Alternative Means of Emission Limitation

Under the provisions of Section 112(e) of the Clean Air Act, if the Administrator establishes work practices, equipment, design or operational standards, then the Administrator must allow the use of alternative means of emission limitations if they achieve a reduction in air pollutants equivalent to that achieved under requirements of a standard of performance. Sufficient data would be required to show equivalency, and a public hearing would be required.

Individual owners or operators could request alternatives for specific requirements, such as the proposed equipment and the proposed leak detection and repair program. Sufficient information would have to be collected by a plant to demonstrate that the alternative control techniques would be equivalent to the control techniques required by the proposed standard. This information would then be submitted to EPA in a request for a determination of equivalence. A public hearing notice would be published in the **Federal Register.**

The data submitted in a request for equivalency of alternative control measures would take the form of test data to substantiate equivalency. To obtain permission to use alternate types of equipment, emission test data would be supplied for comparison to emission data from the specified equipment. Application for equivalence of alternative work practices would require submission of twelve months' data for the leak detection and repair program specified in the proposed standard and data for the alternate system. Based on the data collected for at least one year, an alternative work practice would then be set to take the place of the required work practice.

After public notice and opportunity for public hearing, the Administrator would determine the equivalence of an alternative means of emission limitation and would publish his determination in the **Federal Register.**

Impacts of Reporting Requirements

In addition to requirements of the General Provision of Subpart A of 40 CFR Part 61, the proposed standard would require quarterly reports including information pertaining to the required work practices. Estimates of the efforts associated with the reporting requirements indicate that the industry would incur manpower expenditures of approximately 20 man-years in 1985 to fulfill the requirements. No overlapping data requirements with other government agencies are anticipated.

Selection of Test Method

Several fugitive emission measurement and monitoring methods were identified and analyzed in the development of the proposed standard. Evaluation of these alternative methods was based upon results of emission testing conducted at petroleum refineries and organic chemical manufacturing plant.

One method of emission measurement is the direct measurement of leak rates from each source. Direct measurement of leak rate refers to the determination of mass emissions. For the wide variety of sources subject to the proposed standard, direct measurement would require "bagging" techniques for the determination of mass emissions from each source on a kg/hr basis. "Bagging" means to enclose a fugitive emission source with a shroud in order to capture all of the emissions from the source. The shroud must be attached securely to the source in order to ensure complete capture of emissions, and a flow measurement device is needed to measure the volumetric emission rate. After an appropriate equilibration time (5 to 30 minutes), depending on the shroud and the leak rate, a sample of the effluent from the shroud is taken to determine the organic compound concentration. The mass emission rate is then calculated based on the volume flow rate and concentration. Because of the large numbers of sources in a plant, direct measurements of leak rates would be costly, time-consuming, and impractical for routine testing. Therefore, direct measurement of leak rates was not selected as the emission measurement method for the proposed standard.

Indirect emission measurement methods or monitoring methods that would yield qualitative indications of leaks were reviewed. These monitoring methods are (1) a periodic individual component survey that would monitor all fugitive emission sources using portable detectors; (2) a periodic area, or walkthrough, survey that would monitor background concentrations of organic compounds using portable detectors; and (3) a continuous fixed-point monitoring system that would consist of stationary sensing devices with a remotely located central readout or a central analyzer system (gas chromatograph) with remotely collected samples.

Individual component surveys using portable detectors would be the most efficient method for detecting all leaks. The periodic individual component survey could be performed in a reasonable amount of time by monitoring personnel and could be accomplished with relative ease. The cost of a leak detector for the individual component survey would be reasonable.

Two individual component survey methods were identified: (1) leak detection by spraying each component with a soap solution and observing bubble formation; and (2) leak detection by measuring organic compound concentration with a portable detector. The magnitude of leak rates based on bubble formation is difficult to assess. In addition, bubble formation is subject to component temperature and component configuration restraints. Monitoring with a portable detector reduces the amount of variability in the measurement method. There is still some variability induced by this method, however, because of such uncontrollable factors as operator diligence and training. The portable detector is a good method for determining the number of leaks from a source. However, the correlation between emission rate and number of leaks is marginal. Therefore, for regulatory purposes, the portable detector is not suitable for quantifying the emission rate for each source. For these reasons, measurement of organic compound concentration with a portable detector was selected as the method for monitoring individual components.

A periodic area, or walkthrough, survey of background organic compound concentrations with a portable detector and recorder would be a less effective method for detecting leaks than the individual component survey. Interference due to local meteorological conditions and leaks from adjacent units would probably prevent the detection of all leaks within a process unit. In fact, experience has indicated that the area survey is suitable only for locating large leaks. In order to design a walkthrough method that is as sensitive to leaks as an individual component survey, the "action level" indicating the need to survey equipment within a specific area would need to be very low. In addition, the action level would need to be unit- and meteorology-specific (different action levels for different wind speeds). With an action level this low, the background level of organic compound concentration measured could cause considerable interference. Furthermore, leaks would be indicated almost everywhere within the unit. In many cases, an individual component survey would be necessary to locate the actual leaks. Therefore, since it is not possible to provide an industry-wide action level indicative of leaks for a given process unit, and since any action level that was determined could give so many false indications of leaks that a complete individual component survey would be necessary to detect the actual leaks, a walkthrough survey was not judged to be a reasonable approach for leak detection.

Implementation of a continuous fixed-point minitoring system would require a portable detector to locate specific leaking components in addition to multiple stationary monitors or sample collectors. This system would also be a less efficient method for detecting emissions. Possible meteorological interference and problems with measuring concentrations of remotely collected samples would prevent efficient leak detection by a fixed-point system. Except for possible monitoring equipment calibration problems, the fixed-point system would be operated with relative ease by monitoring personnel, who would still be required to use portable detectors to find the individual leaking components indicated by the fixed-point monitoring system. Implementation of a continuous fixed-point monitoring system would be capital-intensive, although labor costs would probably be the least of the three monitoring methods.

Some characteristics of the three indirect emission measurement methods are similar, including safety considerations and ease of operation for monitoring personnel. Some aspects of the three methods are different. Capital and operating costs vary, as do the efficiencies of the methods in detecting leaks. The component method is characterized by a superior leak detection efficiency and reasonable costs; other aspects of the method, including safety and ease of operation, are similar to those of the walkthrough and fixed-point methods. Therefore, the individual component survey was selected as the monitoring method for the standard. Reference Method 21 is being proposed under 40 CFR Part 60, Appendix A and uses the individual component survey monitoring method and, thus, is the method being recommended for the proposed standard.

Selected Test Procedure—The recommended test method would incorporate the use of a portable detector to measure the concentration of volatile organic vapors at a source to yield a qualitative or semiquantitative indication of the emission rate from the source. The test procedure does not detect benzene specifically; instead, the volatile organic compound concentration is measured. There is commercially available one type of portable detector that has the capability of measuring benzene by chromatographic techniques. However, the addition of the requirement that benzene be measured specifically would require more time and more extensive testing support. Measurement of benzene would not yield additional information, since the designated sources are those in which benzene is transported; and a measure of organic vapor leakage is indicative of a benzene leak.

Tests in petroleum refineries have established concentrations versus mass emission relationships for various fugitive emission sources. Also, tests have indicated that local conditions cause variations in concentration readings at points removed from the surface of the interface on the component where leaking occurs. Therefore, the proposed standard would require the concentration to be measured at the interface surface.

The proposed standard would require periodic monitoring for certain fugitive emission sources, including in-line process valves. These valves would include control, globe, gate, plug, and ball valves in benzene service. For monitoring of these valves, the instrument detector probe would be placed at the interface where the stem exits the packing gland (or O-ring seal). The valve stem circumference would be monitored, and special emphasis would be placed on positioning the probe inlet at the local upwind and downwind side of the stem. If the maximum observed concentration is greater than 10,000 ppm above background, leak would be detected. Monitoring is similar for pumps and compressors.

Additionally, the proposed standard would require that safety/relief valves and product accumulator vessels comply with a no detectable emissions limit. A concentration for no detectable emissions needs to be defined such that when emissions occur they can be detected and when emissions do not occur they are not mistakenly detected. Based on considerations with the calibration procedures and monitor variability, 2 percent of the definition of a leak was selected as the definition of no detectable emissions. Thus, in this case, no detectable emissions means less than 200 ppm above background concentration at the leak interface. To determine compliance with this emission limit for safety/relief valves and product accumulator vessels, the background concentration around each source would first be determined by moving the probe inlet randomly upwind and downwind of the source at a distance of 1 to 2 meters from the source. If an interference exists due to a nearby emission or leak, then the background concentration could be determined at a distance closer to the source; however, this distance could not be less than 25 centimeters from the source. The background concentration would then be noted and the probe inlet would be moved to the surface of the source to conduct the survey.

For safety/relief valves equipped with a rupture disk, the probe inlet would be placed at approximately the center of the exhaust area, or horn. If the observed concentration is greater than 200 ppm above background concentration, a leak would be detected. The sampling would be repeated after each discharge of the valve to verify that the valve has been returned to a state of no detectable emissions.

For safety/relief valves vented to a flare and for accumulator vessels vented to a closed vent system, compliance would be determined by visual inspection and an initial survey of all piping connections prior to the flare or control device. The visual inspection would verify the existence of the required ducting and control device and that there are no sources where emissions could be vented to the atmosphere prior to the control device. The initial sampling survey would verify that there are no detectable emissions from any of the piping connections between the source and the control device. The sampling survey would be repeated after any maintenance work requiring the opening of any piping connections in the closed vent system.

The VOC detector used in the proposed monitoring program would be required to conform to several specifications to ensure consistent industry-wide monitoring, effective VOC emission reduction efforts, and safe leak detection programs. These equipment specifications are as follows: (1) the instrument should respond to total hydrocarbons or combustible gases. Detector types which may meet this requirement include catalytic oxidation, flame ionization, infrared absorption, and photoionization; (2) the instrument should be safe for operation in explosive atmospheres; (3) the instrument should incorporate an appropriate range or dilution option so that concentration levels of 10,000 ppm above background can be measured; (4) the instrument should be equipped with a pump so that a continuous sample can be provided to the detector. The nominal sample flow rate should be 1 to 3 liters per minute; (5) the scale of the instrument readout meter should be readable to ±5 percent at 10,000 ppm above background.

The monitoring instrument would be calibrated before each monitoring survey with methane. Thus, the required calibration gases would be a zero gas (air, <3 ppm VOC) and a methane-air mixture (approximately 10,000 ppm methane). If cylinder calibration gas mixtures would be used, they would have to be analyzed and certified by the manufacturer to within ±2 percent accuracy. Calibration gases prepared by the user according to an accepted gaseous standards preparation procedure would also have to be accurate within ±2 percent.

The monitoring instrument would be subjected to other performance requirements prior to being placed in service for the first time. The instrument would be subjected to the performance criteria every six months and after any modification or replacement of the instrument detector.

The proposed standard also requires that ASTM Method D2267–68 ("Aromatics in Light Naphthas in Aviation Gasoline by Gas Chromatography") be used to determine the percent benzene in the process fluid within a fugitive emission source. This determination would be made only when the exact concentration of benzene is uncertain.

Public Hearing

A public hearing will be held to discuss the proposed standard for benzene fugitive emissions in accordance with Section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations on the proposed standard for benzene fugitive emissions should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble and should refer to docket number A–79–27.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principal purposes of the docket are (1) to allow members of the public and industries involved to identify and locate documents so they can intelligently and effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review.

Miscellaneous

In accordance with Section 117 of the Act, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. In addition, members of the benzene task group of the Interagency Regulatory Liaison Group, representing EPA, OSHA, the Food and Drug Administration, and the Consumer Product Safety Commission, have met and reviewed the proposed standard to ensure that the statement of the rule is jointly understood and is consistent with their programs. The Administrator will welcome comments on all aspects of the proposed regulations, including economic and technological issues, and on the proposed test method.

This regulation will be reviewed five years from the date of promulgation. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and the reporting requirements. The reporting requirements in this regulation will be reviewed as required under the EPA sunset policy for reporting requirements in regulations.

Dated: December 18, 1980.

Douglas M. Costle,

Administrator.

It is proposed to amend 40 CFR Part 61 by adding Subpart J as follows:

Subpart J—National Emission Standard for Benzene Fugitive Emissions

Sec.
61.110 Applicability and designation of sources.
61.111 Definitions.
61.112 Standard for new and existing sources.
61.113 Alternative standard.
61.114 Equivalence of alternative means of emission limitation.
61.115 Test methods and procedures.
61.116 Recordkeeping requirements.
61.117 Reporting requirements.

Authority: Section 112, 301(a) of the Clean Air Act, as amended, (42 U.S.C. 7411, 7601(a)), and additional authority as noted below.

Subpart J—National Emission Standard for Benzene

§ 61.110 Applicability and designation of sources.

(a) The provisions of this subpart apply to each of the following designated sources that are intended to operate in benzene service: pumps, compressors, pipeline valves, safety/relief valves, sampling systems, open-ended valves, pipeline flanges, and product accumulator vessels. The provisions of this subpart do not apply to coke oven by-product plants.

(b) While the provisions of this subpart are effective, a designated source that is also subject to the provisions of 40 CFR Part 60 shall only be required to comply with the provisions of this subpart.

§ 61.111 Definitions.

As used in this subpart, all terms not defined here shall have the meaning given them in the Act and in subpart A of Part 61, and the following terms shall have the specific meanings given them:

"In Benzene Service" means that the fugitive emission source either contains or contacts a fluid (liquid or gas) that is at least 10 percent by weight benzene.

"Closed Vent System" means a system that is not open to atmosphere and is a combination of piping, connections and, if necessary, flow-inducing devices that transports gas or vapor from a fugitive emission source to an enclosed combustion device or vapor recovery system.

"Enclosed Combustion Device" means any combustion device that is not open to atmosphere, such as a process heater or furance, but not a flare.

"First Attempt at Repair" means to take action for the purpose of stopping or reducing leakage of organic material to atmosphere using best modern practices.

"Fixed Capital Cost" means the capital needed to provide all the depreciable components.

"Fugitive Emission Source" means each pump, pipeline valve, safety/relief valve, open-ended valve, flange or other connector, compressor, product accumulator vessel, or sampling system.

"In Gas/Vapor Service" means that the fugitive emission source contains process fluid that is in the gaseous state at operating conditions.

"Open-Ended Valve" means any valve, except safety/relief valves, with one side of the valve seat in contact with process fluid and one side open to atmosphere, either directly or through open piping.

"Pipeline Valve" means the stem packing and collar seat of any externally actuated device that has a stem that extends into the process fluid and is used to regulate the flow of liquids or gases through a pipe.

"Process Unit" means equipment assembled to produce benzene or benzene derivatives as intermediates or final products, or equipment that uses benzene in the production of a final product.

"Product Accumulator Vessel" means any distillate receiver, bottoms receiver, surge control vessel, or product separator in benzene service that is vented to atmosphere either directly or through a vacuum-producing system. A product accumulator vessel is in benzene service if the liquid or the vapor in the vessel is at least 10 percent by weight benzene.

"Reconstruction" means the replacement of components of an existing source to such an extent that:

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable, entirely new source; and

(2) It is feasible, considering economic impacts and the technological problems associated with retrofit, to meet the applicable standard for new sources set forth in this subpart.

"Repaired" means that a fugitive emission source is adjusted or otherwise altered in order to reduce fugitive emissions below the level which indicates the necessity for repair as required in § 61.112.

"In Vacuum Service" means that the fugitive emission source is operating at internal pressures that are continously less than 100 kPa.

"Vapor Recovery System" means any type of control device capable of capturing benzene vapor from a gas stream, such as carbon adsorption, vapor compression and vapor refrigeration systems.

§ 61.112 Standard for new and existing sources.

Each owner or operator subject to the provisions of this subpart shall comply with the following requirements for fugitive emission sources in benzene service, execpt those in vacuum service:

(a) New pumps and compressors.

(1) Each new pump shall be equipped with a dual mechanical seal system that includes a barrier fluid between the seals, except as provided in §§ 61.112(a)(7), 61.112(a)(8), and 61.112(i). Each new compressor shall be equipped with a seal system that includes a barrier fluid and that prevents leakage of process fluid to atmosphere, except as provided in §§ 61.112(a)(7), 61.112(a)(8), and 61.112(i). Benzene concentration in the barrier fluid shall be maintained below 10 percent by weight at all times.

(2) Each system as required in § 61.112(a)(1) shall be equipped with a sensor that will detect failure of the seal system, the barrier fluid system, or both.

(3) Each sensor as required in § 61.112(a)(2) shall be checked daily or shall be equipped with an audible alarm. Based on design considerations and operating experience, a criterion that indicates failure of the seal system, the barrier fluid system, or both shall be determined for each dual mechanical seal system. If this criterion is registered by the sensor, a leak is detected.

(4) Each pump shall be checked by visual inspection, each calendar week, for indications of liquids dripping from the pump seal. If indications of liquids dripping from the pump seal are observed, a leak is detected.

(5) When leak is detected, it shall be repaired as soon as is practicable, but no later that 15 calendar days after the leak is deteced. A first attempt at repair shall be made no later than five calendar days after each leak is detected.

(6) Each dual mechanical seal system as required in § 61.112(a)(1) shall be—

(i) Operated with the barrier fluid at a pressure that is greater at all times than the pump stuffing box pressure,

(ii) Equipped with a barrier fluid degassing reservoir that is connected by a closed vent system to an enclosed combustion device designed for a minimum residence time of 0.50 seconds at 760°C or to a vapor recovery system designed for a minimum of 95 percent capture of benzene input to the vapor recovery system, or

(iii) Designed and operated so that no benzene can be emitted to atmosphere when barrier fluid purging is required.

(7) Any new pump or compressor that is not equipped with the requirements of § 61.112(a)(1) shall be equipped with a closed vent system capable of transporting all leakage from the seal to an enclosed combustion device designed to provide a minimum residence time of 0.50 seconds at a minimum temperature of 760°C or to a vapor recovery system designed for a minimum of 95 percent capture of benzene input to the system. Closed vent systems, enclosed combustion devices, and vapor recovery systems used to comply with this requirement shall be operated at all times when benzene emissions may occur.

(8) Any new pump or compressor that is designated as required in § 61.116(d)(1) for emissions having a concentration of less than 200 parts per million (ppm) by volume above background, as determined by the methods specified in § 61.115(b), is exempt from the requirements of § 61.112(a)(1)–(7) if the pump—

(i) Has no externally actuated shaft penetrating the pump housing,

(ii) Is operated with emissions less that 200 ppm above background as determined by the methods specified in § 61.115(b), and

(iii) Is tested for compliance with § 61.112(a)(8)(ii) annually and at the request of the Administrator.

(9) Closed vent systems, enclosed combustion devices, and vapor recovery systems used to comply with §§ 61.112(a)(6) (ii) and (iii) shall be operated at all times when benzene from the barrier fluid degassing reservoir may occur.

(b) Safety/relief valves in gas/vapor service.

(1) Each safety/relief valve in gas/vapor service shall be operated at a state of emissions having a concentration of less than 200 ppm above background, as determined by the methods specified in § 61.115(b), except during pressure releases.

(2) Each safety/relief valve shall be returned to a state of emissions having a concentration of less than 200 ppm above background after each pressure release as soon as is practicable, but no later than five calendar days, after each pressure release.

(c) Sampling systems.

(1) Each sampling system shall be equipped with a closed purge system.

(2) Each closed purge system as required by § 61.112(c)(1) shall return the purged process fluid directly to the process line, or shall collect the purged process fluid for recycle or disposal without benzene emissions to atmosphere.

(3) *In-situ* sampling systems are exempt from §§ 61.112(c) (1) and (2).

(d) Pipeline valves, open-ended valves, and existing pumps and compressors.

(1) Each pipeline valve, existing pump, and existing compressor shall be monitored monthly to detect leaks by the methods specified in § 61.115(a). If a concentration greater than or equal to 10,000 ppm above background is measured, a leak is detected.

(2) When a leak is detected, it shall be repaired as soon as is practicable, but no later than 15 days after it is detected except as provided in § 61.112(g). A first attempt at repair of the designated source shall be made no later than five calendar days after each leak is detected.

(3) First attempts at repair for pipeline valves should include, but are not limited to, the following procedures, if practicable:

(i) Tightening of bonnet bolts.

(ii) Replacement of bonnet bolts.

(iii) Tightening of packing gland nuts.

(iv) Injection of lubricant into lubricated packing.

(4) Any pipeline valve for which a leak is not detected for two successive months may be monitored during the first month of every quarter beginning with the next quarter by the methods specified in § 61.115(a) until a leak is detected. If a leak is detected, the valve shall be monitored monthly until a leak is not detected for two successive months.

(5) Any pipeline valve, existing pump, or existing compressor that is designated as required in § 61.116(d)(1) for emissions having a concentration less than 200 ppm above background, as determined by the methods specified in § 61.115(b), is exempt from the requirements of §§ 61.112 (d) (1)–(4) if it—

(i) Has no external actuating mechanism in contact with the process fluid,

(ii) Is operated with emissions having a concentration less than 200 ppm above background, as determined by the methods specified in § 61.115(b), and

(iii) Is tested for compliance with § 61.112(d)(5)(ii) annually and at the request of the Administrator.

(6) Each open-ended valve shall be equipped with a cap, blind, plug, or a closed second valve that is attached to seal the open end at all times except during operations requiring flow through the open-ended valve.

(7) Each open-ended valve equipped with a second valve, as required in § 61.112(d)(6), shall be operated such that the open-ended valve is completely closed before the second valve is closed.

(8) Any existing pump or existing compressor that is designated as required in § 61.116(d)(1) for compliance with the new pump or compressor requirements in § 61.112(a) is exempt from the requirements of § 61.112(d). These existing pumps and compressors shall comply with the requirements of § 61.112(a).

(9) Each pump shall be checked by visual inspection each calendar week for indications of liquids dripping from the pump seal. If indications of liquids dripping from the pump seal are observed, a leak is detected.

(e) Product accumulator vessels.

(1) Each product accumulator vessel shall be operated at a state of emissions having a concentration less than 200 ppm above background, as measured by the methods specified in § 61.115(b)

(2 Product accumulator vessels that are used in the production of ethylbenzene or styrene are exemped from § 61.112(e)(1).

(3) Closed vent systems used to achieve compliance with § 61.112(e)(1) shall be designed to transport emissions from the product accumulator vessel to either an enclosed combustion device designed to provide a minimum residence time of 0.50 seconds at a minimum temperature of 760°C or to a vapor recovery system designed for a minimum of 95 percent capture of benzene input to the system. Closed vent systems, enclosed combustion devices, and vapor recovery systems used to comply with the requirement specified in § 61.112(e)(1) shall be operated at all times when benzene emissions may occur.

(f) Other fugitive emission sources.

(1) Fugitive emission sources in benzene service that are not covered in §§ 61.112 (a)–(e) of this subpart, such as safety/relief valves in liquid service and pipeline flanges or other connectors, shall be monitored to detect leaks by the methods specified in § 61.115(a) as soon as practicable, but no later than five calendar days, after leakage is detected by visual, audible, olfactory, or any other method.

(2) If a concentration greater than or equal to 10,000 ppm above background is measured, a leak is detected.

(3) If a leak is detected, it shall be repaired as soon as is practicable, but no later than 15 calendar days after the leak is detected, except as provided in § 61.112(g) of this subpart. A first attempt at repair shall be made within five calendar days after each leak is detected.

(g) Delay of repair of fugitive emission sources for which leaks have been detected will be allowed only if repair is technically infeasible without a complete or partial process unit shutdown. Delay of repair will not be allowed beyond a process unit shutdown.

(h) Each designated source shall be marked in such a manner that will be readily obvious to both plant and enforcement personnel.

(i) A determination of equivalence of alternative means of emission limitation to the requirements of §§ 61.112(a), (c), (d), and (f) may be requested as provided in § 61.114. If the Administrator determines that an alternative means of emission limitation is at least equivalent to the requirements of §§ 61.112(a), (c), (d), and (f), the requirements of that determination shall apply.

(j) Upon reconstruction, an existing source shall become a new source for the purposes of this subpart.

(k) Compliance with §§ 61.112 (a)–(j) shall be determined by review of records and inspection. Compliance with §§ 61.112(a)(8), (b), (d)(5), and (e) shall be determined by the methods specified in § 61.115(b).

§ 61.113 Alternative standard.

(a) Pipeline valves in benzene service—allowable percentage of leaking valves.

(1) After performing a monthly leak detection and repair program in accordance with §§ 61.112(d) (1)–(5) for at least 12 months, an owner or operator may request approval from the Administrator to comply with an allowable percentage of leaking pipeline valves in benzene service.

(2) The following requirements shall be met if an owner or operator wishes to comply with an allowable percentage of leaking pipeline valves:

(i) An owner or operator must request approval of the Administrator to comply with an allowable percentage of leaking valves.

(ii) An owner or operator must have performed a monthly leak detection and repair program in accordance with §§ 61.112(d) (1)–(5) for at least 12 months before a request for approval is submitted.

(iii) A request for approval of an allowable percentage of leaking valves musts be accompanied by data and calculations which describe the methodology used for determining the allowable percentage of leaking valves.

(iv) A performance test as specified in § 61.113(a)(4) shall be conducted annually and at the request of the Administrator. A written report of the results of the performance test shall be submitted to the Administrator within a time interval specified by the Administrator.

(v) If a valve leak is detected, an attempt must be made to repair it.

(3) The allowable percentage of leaking valves shall be determined by adding the monthly baseline percentage of leaking valves demonstrated during the last six months under monthly monitoring and the monthly incremental percentage of leaking valves which would have occurred if the provisions of § 61.112(d)(4) had been followed.

(i) The monthly baseline percentage of leaking valves shall be determined by obtaining a monthly average of the percentage of leaking valves found in an affected process unit during the last six months of operation under monthly monitoring.

(ii) The monthly incremental percentage of leaking valves shall be determined by averaging the percentage of valves for which leaks had been detected in the second and third months of the last two quarters but which had not been detected during the first months of the last two quarters.

(iii) A percentage of leaking valves shall be determined by dividing the total number of leaking valves by the total number of valves in an affected process unit, excluding those leaking valves for which repair has been delayed because a process unit shutdown would be required as provided in § 61.112(g) and those valves which are complying with the provisions of § 61.112(d)(5).

(4) Performance tests shall be conducted in the following manner:

(i) All valves within the affected process unit shall be monitored by the methods specified in § 61.115(a).

(ii) If a VOC concentration of 10,000 ppm or greater is measured, a leak is detected.

(iii) The leak percentage shall be determined by dividing the number of valves for which leaks are detected by the number of valves within the affected process unit, excluding valves for which repair has been delayed because a process unit shutdown would be required, and those which are complying with the provisions of § 61.112(d)(5).

(iv) For those valves for which repair has been delayed because a process unit shutdown would be required, records of attempted repair must be provided at the request of the Administrator. Records of attempted repair for those valves for which repair has been delayed shall be kept for two years.

(5) (i) The Administrator will approve or disapprove this alternative within 90 days of the request for approval.

(ii) If the Administrator denies the use of this alternative, the Administrator will notify the owner or operator of the reasons for the denial.

(iii) If the Administrator is reviewing a request for the use of this alternative as specified in §§ 61.113(a) (1) and (2), the Administrator may request additional information. If the Administrator is reviewing a denial of this alternative, as specified in § 61.113(a)(5)(i), the Administrator may request additional information.

(iv) The owner or operator shall be subject to the requirements of §§ 61.112(d)(1)–(5) until this alternative is approved.

(6) The reporting provisions of §§ 61.117(b)(2)–(6) and (8) would not apply to owners or operators complying with an allowable percentage of leaking valves.

(b) Pipeline valves in benzene service-alternative work practices.

(1) After performing a monthly leak detection and repair program in accordance with §§ 61.112(d)(1)–(5) for at least 12 months, an owner or operator may request approval of the Administrator to comply with an alternative work practice for pipeline valves in benzene service which differs from the work practice required in §§ 61.112(d) (1) and (4).

(2) The following requirements shall be met if an owner or operator wishes to comply with an alternative work practice:

(i) An owner or operator must request approval of the Administrator to comply with an alternative work practice standard.

(ii) An owner or operator must have performed a monthly leak detection and repair program in accordance with §§ 61.112(d)(1)–(5) for 12 months before a request for approval is submitted.

(iii) A request for approval of an alternative work practice standard must be accompanied by data and calculations showing that the alternative work practice complies with the requirements of § 61.113(b)(3).

(3) The alternative work practice program shall be designed to accomplish the emission reduction associated with the required program in §§ 61.112(d)(1)–(5). To demonstrate this reduction, an owner or operator shall determine the leak occurrence and recurrence for each program. These data shall be used to show that the expected percentage of leaking valves in the affected process unit under the alternative program is equal to or less than the expected percentage of leaking valves under the required program.

(4)(i) The Administrator will approve or disapprove this alternative within 90 days of the request for approval.

(ii) If the Administrator denies the use of this alternative work practice, the Administrator will notify the owner or operator of the reasons for the denial.

(iii) If the Administrator is reviewing a request for the use of this alternative work practice as specified in §§ 61.113(b) (1) and (2), the Administrator may request additional information. If the Administrator is reviewing a denial of this alternative work practice, as specified in § 61.113(b)(4)(i), the Administrator may request additional information.

(iv) The owner or operator shall be subject to the requirements of §§61.112(d)(1)–(5) until this alternative is approved.

§ 61.114 Equivalence of alternative means of emission limitation.

(a) Each owner or operator subject to the provisions of this subpart may apply to the Administrator for determination of equivalence for any alternative means of emission limitation that achieves a reduction in emissions of benzene at least equivalent to the reduction in emissions of benzene of the controls required in §61.112.

(b) Determination of equvalence to the equipment requirements in §§ 61.112 (a), (c), and (d) will be evaluated by the following guidelines:

(1) Each owner or operator apply for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of an alternative means of emission limitation to the requirements of §§ 61.112 (a), (c), and (d).

(2) The Administrator will compare test data for the alternative means of emission limitation to test data for the specific equipment requirement.

(3) The Administrator may condition approval of equivalency on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the equipment requirements of §§ 61.112 (a), (c), and (d).

(c) Determination of equivalence to the work practices required in § 61.112(d) will be evaluated by the following guidelines:

(1) Each owner or operator applying for an equivalence determination shall be responsible for collecting and verifying test data to demonstrate equivalence of an alternative means of emission limitation to the requirements of § 61.112(d).

(2) For designated sources for which a determination of equivalence is requested, the emission reduction achieved by the requirements of § 61.112(d) shall be demonstrated for a minimum period of 12 months. A quantitative performance level shall be determined that describes the emission reduction achieved by the requirements of § 61.112(d).

(3) For these designated sources, the emission reduction achieved by any alternative means of emission limitation shall be demonstrated.

(4) Each owner or operator applying for a determination of equivalence shall commit to compliance with a performance that provides for emission reductions equal to or greater than the emission reductions achievable by the requirements of § 61.112(d).

(5) The Administrator will compare the demonstrated emission reduction for the alternative means of emission limitation to the demonstrated emission reduction for the work practice requirements of § 61.112(d) and will consider the commitment in § 61.114(c)(4).

(6) The Administrator may condition approval of equivalency on requirements that may be necessary to assure operation and maintenance to achieve the same emission reduction as the requirements of § 61.112(d).

(d) After a request for determination of equivalence is received, the Administrator will publish a notice in the **Federal Register** and provide the opportunity for public hearing. After notice and opportunity for public hearing, the Administrator will determine the equivalence of an alternative means of emission limitation and will publish the determination in the **Federal Register.**

§ 61.115 Test methods and procedures.

Each owner or operator subject to the provisions of this subpart shall comply with the following test method and procedure requirements:

(a) Monitoring as required by § 61.112(d)(1) shall comply with the following requirements:

(1) Monitoring shall comply with 40 CFR Par' 60, Appendix A, Reference Method 21.

(2) The detection instrument shall meet the performance criteria of 40 CFR Part 60, Appendix A, Reference Method 21.

(3) The instrument shall be calibrated on the day of its use by the methods specified in 40 CFR Part 60, Appendix A, Reference Method 21.

(4) Calibration gases shall be:

(i) zero air (less than 3 ppm of VOC in air), and

(ii) approximately 10,000 ppm methane in air.

(5) The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible, as described in 40 CFR Part 60, Appendix A, Reference Method 21.

(b) When fugitive emission sources are tested for emissions having a concentration less than 200 ppm above background as required by §§ 61.112 (a), (b), and (d), the testing shall comply with the following requirements:

(1) The requirements of §§ 61.115(a) (1), (2), (3), and (4) shall apply.

(2) If a test for emissions less than 200 ppm above background is requested by the Administrator, then the background level shall be determined and the instrument probe shall be traversed around all potential leak interfaces at the minimum distance possible, as set forth in 40 CFR Part 60, Appendix A, Reference Method 21.

(3) If the difference in the background level and the concentration level measured at all potential leak interfaces is less than 200 ppm, then the emissions are less than 200 ppm above background.

(c) For purposes of determining the percent benzene in the process fluid within a fugitive emission source, procedures that conform to the general methods in ASTM Method D2267-68 shall be used.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 61.116 Recordkeeping requirements.

Each owner or operator subject to the provisions of this subpart shall comply with the following recordkeeping requirements:

(a) When each leak is detected as specified in §§ 61.112 (a), (d), and (f), the following requirements shall apply:

(1) Weatherproof and readily visible identification, marked with the source identification number, shall be attached to the leaking source.

(2) The identification may be removed after the fugitive emission source (except pipeline valves) has been repaired. For pipeline valves, the identification may be removed after it has been monitored for two successive months as specified in § 61.112(d)(4) and no leak has been detected during those two months.

(b) When each leak is detected as specified in §§ 61.112 (a), (d), and (f), the following information shall be recorded in a log and shall be kept for two years in a readily accessible location:

(1) The instrument and operator identification numbers and the source identification number.

(2) The date the leak is detected and the dates of each attempt to repair the leak.

(3) Repair methods applied in each attempt to repair the leak.

(4) Whether the maximum VOC concentration measured by the methods specified in § 61.115(a) after each repair attempt was greater than or less than 10,000 ppm above background.

(5) "Repair delayed" if a leak is not repaired within 15 calendar days after discovery of the leak.

(6) The signature of the owner or operator whose decision it was that repair could not be effected without a process unit shutdown.

(7) the expected date of successful repair of the leak if a leak is not repaired within 15 days.

(8) the date of successful repair of the leak.

(c) The following information pertaining to the design requirements for closed vent systems, enclosed combustion devices, and vapor recovery systems specified in § 61.112 (a) and (e) shall be recorded and kept in a readily accessible location:

(1) Detailed schematics, design specifications, and piping and instrumentation diagrams.

(2) The dates and descriptions of any changes in the design specifications.

(3) Dates of startups and shutdowns of enclosed combustion devices and vapor recovery systems specified in § 61.112 (a) and (e) and dates when these systems are not functioning as designed.

(d) the following information pertaining to all fugitive emission sources subject to the requirements in §§ 61.112 (a), (b), (d), and (e) shall be recorded in a log that is kept in a readily accessible location:

(1) A list of identification numbers for fugitive emission sources that are designated for emissions having a concentration less than 200 ppm above background under the provisions of §§ 61.112 (a)(8), (b)(1), (d)(5), and (e)(1) and are designated for compliance with new source requirements under the provisions of § 61.112(d)(8). The designation of these sources as subject to these sections shall be signed by the owner or operator.

(2) the dates of each verification test for emissions having a concentration less than 200 ppm above background.

(3) the background level measured during each verification test as described in § 61.115(b).

(4) the maximum VOC concentration measured at the source during each verification test as described in § 61.115(b).

(e) The following information shall be recorded in a log that is kept in a readily accessible location:

(1) the design criterion required in § 61.112(a)(3).

(2) Any changes to this criterion and the reasons for the change. (Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414).)

§ 61.117 Reporting requirements.

Each owner or operator subject to the provisions of this subpart shall comply with the following reporting requirements:

(a)(1) An owner or operator of any source to which this subpart applies shall submit a statement in writing notifying the Administrator that the requirements of §§ 61.112, 61.116, and 61.117 are being implemented.

(2) In the case of an existing source or a new source which has an initial startup date preceding the effective date, the statement is to be submitted within 90 days of the effective date, unless a waiver of compliance is granted under § 61.11, along with the information required under § 61.10. If a waiver of compliance is granted, the statement is to be submitted on a date scheduled by the Administrator.

(3) In the case of new sources which did not have an initial startup date preceding the effective date, the statement shall be submitted with the application for approval of construction or modification, § 61.07.

(4) the statement is to contain the following information for each designated source:

(i) Fugitive emission source identification number.

(ii) Type of fugitive emission source (i.e., pump, pipeline valve, etc.).

(iii) Percent by weight benzene in the fluid at the fugitive emission source.

(iv) Process fluid state at the fugitive emission source (gas/vapor or liquid).

(v) Method of compliance with the standard (i.e., "equipped with dual mechanical seal system," or "monthly leak detection and repair," etc.).

(b) A report shall be submitted to the Administrator each quarter, starting three months after the initial report required in § 61.117(a), that includes the following information; the format of the report may be similar to that shown in Figures 1, 2, 3, and 4:

(1) Process unit identification.

(2) Nunber of pipeline valves in the process unit excluding those designated for emissions having a concentration less than 200 ppm above background under the provisions of § 61.112(d)(5).

(3) Number of pipeline valves, existing pumps, and existing compressors for which leaks were detected as required in § 61.112(d) during each month of the reporting quarter.

(4) Number of pipeline valves, existing pumps, and existing compressors repaired.

(5) Number of pipeline valves, existing pumps, and existing compressors not repaired within 15 days as required in § 61.112(d)(2).

(6) Reasons for non-repair of valves, existing pumps, and existing compressors within 15 days as required in § 61.112(d)(2).

(7) Number of pumps and compressors for which leaks were detected during the reporting quarter as specified in §§ 61.112(a)(3) and (4).

(8) Statement signed by the owner or operator stating whether all provisions of 40 CFR Part 61 Subpart J had been fulfilled during the reporting quarter.

(c) In the first report submitted as required in § 61.117(b), the report shall include a reporting schedule stating the months that quarterly reports shall be submitted. Subsequent reports shall be submitted according to that schedule, unless a revised schedule has been submitted in a previous quarterly report.

(d) An application for approval of construction or modification, § 61.07, will not be required if—

(1) The existing source has become a new source through reconstruction;

(2) The new source complies with the standard for new sources, § 61.112; and

(3) In the next quarterly report required by § 61.117(b), the information in § 61.117(a)(4) is reported.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414).)

BILLING CODE 6560-01-M

Figure 1

QUARTERLY REPORT FOR PROCESS UNIT FUGITIVE EMISSION SOURCES OPERATING UNDER THE PROVISIONS OF 40 CFR Part 61, Subpart J, §61.117(b)

Date____________________

Company Name____________________

Plant Location (City, State)____________________

Mailing Address____________________

____

Telephone Number____________________

Reporting Period____________________

This report filed____________________
(Process Unit Name)

Producing____________________
(Chemical Product(s))

EXAMPLE

Figure 2

SUMMARY STATISTICS FOR LEAK DETECTION AND REPAIR REQUIREMENTS OF 40 CFR Part 61, Subpart J, §61.117(b)

1. Process Unit Name____________________
(one report required for each process unit)
2. Number of valves covered under the leak detection and repair program. ________
3. Number of valves found leaking during the reporting period. ________
4. Number of leaking valves repaired during the reporting period. ________
5. Number of leaking valves detected during the quarter which were not repaired within 15 days. ________
6. Number of pumps found leaking during the reporting period. ________
7. Number of compressors found leaking during the reporting period. ________

EXAMPLE

Figure 3

INFORMATION REQUIRED BY 40 CFR Part 61, Subpart J, §61.112(d)(2)
FOR LEAKING VALVES NOT REPAIRED WITHIN 15 DAYS

1. Process Unit Name____________________________
2. Number of valves, pumps, and compressors not repaired for the following reasons:
   - (a) New parts required. __________
   - (b) Off-line repair required. Critical in-service valve. Bypass impossible. __________
   - (c) Other (Explain reasons for non-repair) __________
3. Date of next scheduled turn-around or shutdown. __________

____
Signature of Plant Manager or
Manager Designate

Figure 4

CERTIFICATION
AS REQUIRED IN §61.117(b)(8)

I hereby certify that process unit________________(Name) owned (operated) by____________________(Company Name) located in________________(City, State) ________________(has been/has not been) operated in compliance with the requirements of Subpart J, 40 CFR Part 61 which contains National Emission Standard for Benzene Fugitive Emissions.

All required equipment and control devices have been operated and maintained in compliance with the standard. All required work practices have been followed. Monitoring has been done as specified in Method 21. All required records have been made and are kept in____________________(location in plant) for review by EPA.

____
(Signature of owner or operator)

____
(title)

____
(date)

EXAMPLE

EXAMPLE

[FR Doc. 81-60 Filed 1-2-81; 8:45 am]
BILLING CODE 6560-01-C

Federal Register / Vol. 46, No. 19 / Thursday, January 29, 1981 / Proposed Rules

40 CFR Part 61

[AD-FRL-1740-8]

National Emission Standards for Hazardous Air Pollutants; Benzene Fugitive Emissions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amended notice of public hearing and extension of public comment period.

SUMMARY: The public hearing has been postponed 62 days and the end of the public comment period extended 63 days for the proposed national emission standard for benzene fugitive emissions in response to a request from the American Petroleum Institute. This request expressed the need to complete their own exposure modeling and technical and economic analyses in order to evaluate EPA's data base and to provide additional information.

DATES: Written comments to be included in the record on the proposed standard must be postmarked no later than June 8, 1981. Notice of intent to present oral testimony at the public hearing must be postmarked no later than April 28, 1981. The public hearing will be held on May 5, 1981. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than June 8, 1981.

ADDRESSES: Comments on the proposed standard should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-27, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

The public hearing will be held at the EPA Administration Building Auditorium, Research Triangle Park, North Carolina, beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

SUPPLEMENTARY INFORMATION: On January 5, 1981, the Administrator proposed in the Federal Register (46 FR 1165) a national emission standard for benzene fugitive emissions. In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards. This notice revises the date of the public hearing and extends the end of the public comment period as discussed in the summary section of this preamble.

Dated: January 22, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 81-3310 Filed 1-28-81; 8:45 am]

Federal Register / Vol. 46, No. 57 / Wednesday, March 25, 1981 / Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-1787-4]

National Emission Standards for Hazardous Air Pollutants; Benzene Fugitive Emissions

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amended notice of public hearing and extension of public comment period.

SUMMARY: The public hearing has been postponed 70 days and the end of the public comment period extended 70 days for the proposed national emission standard for benzene fugitive emissions in response to a request from the American Petroleum Institute.

DATES: Written comments to be included in the record on the proposed standard must be postmarked no later than August 14, 1981. Notice of intent to present oral testimony at the public hearing must be postmarked no later than July 7, 1981. The public hearing will be held on July 14, 1981. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than August 14, 1981.

ADDRESSES: Comments on the proposed standard should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-27, U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460.

The public hearing will be held at the EPA Administration Building Auditorium, Research Triangle Park, North Carolina, beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5571.

FOR FURTHER INFORMATION CONTACT: Susan Wyatt, (919) 541-5580.

SUPPLEMENTARY INFORMATION: On January 5, 1981, EPA proposed in the **Federal Register** (46 FR 1165) a national emission standard for benzene fugitive emissions. In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards. This notice amends the date of the public hearing and extends the end of the public comment period.

Dated: March 19, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-9106 Filed 3-24-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-1861-4]

National Emission Standards for Hazardous Air Pollutants; Benzene Fugitive Emissions; Benzene Emissions from Benzene Storage Vessels

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extensions of public comment periods.

SUMMARY: The end of the public comment period has been extended 30 days for the proposed national emission standard for benzene fugitive emissions and the proposed national emission standard for benzene emissions from benzene storage vessels. 45 FR 83952, December 19, 1980, 46 FR 18561, March 25, 1981.

DATES: Written comments to be included in the record on the proposed standards must be postmarked no later than September 14, 1981, for the proposed national emission standard for benzene fugitive emissions and August 10, 1981, for the proposed national emission standard for benzene emissions from benzene storage vessels. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than September 14, 1981, and August 10, 1981, for the proposed benzene fugitive and benzene storage emission standards, respectively.

ADDRESSES: Comments on the proposed standard for bezene fugitive emissions should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-27, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

Comments on the proposed standard for benzene emissions from benzene storage vessels should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-14, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Ms. Susan Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, (919) 541-5578.

SUPPLEMENTARY INFORMATION: EPA received a request to extend the public comment periods for the two proposed standards because the public hearing for the proposed benzene fugitive emissions standard was close to the end of the comment period for the proposed benzene storage vessels standard. The comment periods for the proposed standards were extended, therefore, in order to provide an opportunity for more meaningful public participation in the proposed rulemaking.

Dated: June 18, 1981.

Edward F. Tuerk,

Acting Assistant Administrator.

[FR Doc. 81-[illegible] Filed 6-23-81: 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

BENZENE EMISSIONS FROM BENZENE STORAGE VESSELS

SUBPART K

K

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-1609-8]

Benzene Emissions From Benzene Storage Vessels; National Emission Standard for Hazardous Air Pollutants; Hearing

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed Rule and Notice of Public Hearing.

SUMMARY: The proposed standard would limit benzene emissions from each new and existing storage vessel with a capacity greater than 4 cubic meters used to store pure benzene. Each new and existing benzene storage vessel would be required to have a fixed roof in combination with an internal floating roof that rests on the liquid surface inside the storage vessel. Each storage vessel would also have to be equipped with a liquid-mounted primary seal and a continuous secondary seal. Periodic inspections of the internal floating roof and seals would be required to help ensure that the equipment is being properly operated and maintained.

The proposed standard implements Section 112 of the Clean Air Act and is based on the Administrator's determination of June 8, 1977, that benzene presents a significant carcinogenic risk to human health as a result of benzene emissions to the atmosphere from one or more stationary source categories and is, therefore, a hazardous air pollutant. The intent of the standard is to protect the public health with an ample margin of safety.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the proposed standard for benzene storage vessels.

DATES: *Comments.* Comments must be received on or before March 12, 1981.

Public Hearing. A public hearing will be held on February 10, 1981 beginning at 9:00 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by February 3, 1981.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate, if possible) to: Central Docket Section (A-130), Attention: Docket No. A-80-14, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at EPA Administration Bldg. Auditorium, Research Triangle Park, N.C. Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-[illegible]), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5331.

Background Information Document. The background information document for the proposed standard is contained in the docket and may be obtained from the U.S. EPA library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to "Benzene Emissions from Benzene Storage Vessels—Background Information for Proposed Standards," (EPA-450/3-80-034a). Other pertinent documents that may be obtained from this address include: "Assessment of Health Effects of Benzene Germane to Low Level Exposures," "Assessment of Human Exposures to Atmospheric Benzene," and "Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures."

Docket. Docket No. A-80-14, which contains supporting information used in developing the proposed standard, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460. Supplementary information on the regulation of benzene emissions can be obtained from the Maleic Anhydride Docket No. OAQPS-79-3, which is available for public review at EPA's Central Docket Section. A fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Ms. Susan Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5477.

SUPPLEMENTARY INFORMATION: Notice is hereby given that, under the authority of Section 112(b)(1)(B) of the Clean Air Act (as amended), the Administrator is proposing a national emission standard for benzene emissions from benzene storage vessels. The proposed standard has been developed consistent with the EPA "Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer" (44 FR 58642) proposed on October 10, 1979, although these policy and procedures are not final. As prescribed in Section 112(b)(1)(A) of the Act, the proposal of this standard was preceded by the Administrator's determination that benzene is a hazardous air pollutant as defined in Section 112(a)(1) of the Act. Accordingly, the Administrator revised the list of hazardous air pollutants on June 8, 1977, by adding benzene (42 FR 29332).

A background information document has been prepared that contains information on benzene storage vessels, the available technologies for controlling benzene emissions from these storage vessels, and an analysis of the environmental, energy, economic, and inflationary impacts of the regulatory alternatives. Information on the health effects of benzene is contained in documents prepared by or for EPA entitled the "Assessment of Health Effects of Benzene Germane to Low Level Exposure," the "Assessment of Human Exposures to Atmospheric Benzene," and the "Carcinogen Assessment Group's Report on Population Risk to Ambient Benzene Exposures." The information contained in these documents is summarized in this preamble. All references used for the information contained in the preamble can be found in one of the four documents, except as noted.

Proposed Standard

The proposed standard would apply to each new and existing storage vessel used to store benzene with a specific gravity within the range of specific gravities specified for Industrial Grade benzene in ASTM-D-836-77, and which has a storage capacity greater than 4 cubic meters. It would not apply to storage vessels used for storing benzene at coke oven byproduct facilities because a separate standard is being developed for these storage vessels.

The proposed standard would reduce benzene emissions from the affected storage vessels by requiring that each storage vessel have a fixed roof in combination with an internal floating roof that rests on the liquid surface. It would also require that each internal floating roof have a liquid-mounted primary seal and a continuous secondary seal. Equipment demonstrated to be equivalent in terms of emissions reduction would also be allowed.

To help ensure that the control equipment is being properly operated and maintained, periodic inspections of the control equipment would be required. The internal floating roof, primary seal, and secondary seal would have to be inspected from inside each storage vessel prior to filling of the vessel and at least once every 5 years thereafter. A floating roof having defects or a seal having holes or tears would have to be repaired before the storage vessel could be filled with benzene.

The internal floating roof and the secondary seal would also have to be inspected through roof hatches on the fixed roof at least once every 3 months. As viewed through the roof hatches, if there were product accumulated on or visible defects in the internal floating roof, visible gaps between the secondary seal and the wall of the storage vessel, or holes, tears, or other openings in the secondary seal or the seal fabric, these items would have to be repaired or replaced. All repairs would have to be made within 30 days or the storage vessel would have to be emptied.

Each existing source would have to comply with the standard within 90 days of its effective date, unless a waiver of compliance is obtained. A waiver of compliance could be granted by the Administrator for no more than 2 years from the promulgation date.

Summary of Health, Environmental, Energy, and Economic Impacts

Approximately 500 existing benzene storage vessels would be affected by the standard. These storage vessels are located at 143 facilities including 62 benzene producing facilities (e.g., refineries), 77 benzene consuming facilities (e.g., chemical plants), and 4 bulk storage terminals.

The proposed standard would reduce the national benzene emissions from existing storage vessels from about 2,200 megagrams per year (Mg/year) to about 510 Mg/year. As a result of this emission reduction, the lifetime risk to the most exposed population would be reduced from a range of 1.5×10^{-4} to 1.0×10^{-3} to a range of 2.7×10^{-5} to 1.9×10^{-4}. The projected incidence of excess leukemia deaths resulting from exposure to benzene emissions from existing benzene storage vessels would be reduced from a range of 0.12 to 0.82 deaths per year to a range of 0.03 to 0.20 deaths per year for the 85 million people estimated to live within 20 kilometers of existing benzene storage vessels. A reduction in other health effects associated with benzene exposure (such as ctyopenia, aplastic anemia, and chromosomal aberrations) is also expected.

The proposed standard would also significantly reduce the emissions from new benzene storage vessels. By 1985 there will be an estiamted 168 new benzene storage vessels in use at 49 new facilities. Implementation of the proposed standard would reduce the 1985 emissions from new storage vessels from about 930 megagrams (Mg) to about 170 Mg. This emissions reduction would reduce the lifetime risk to the most exposed population from a range of 1.5×10^{-4} to 1.0×10^{-3} to a range of 2.7×10^{-6} to 1.9×10^{-4}. The projected incidence of excess leukemia deaths in 1985 resulting from benzene emissions from new benzene storage vessels would be reduced from a range of 0.05 to 0.34 deaths to a range of 0.01 to 0.07 deaths. The 1985 emissions from both new and currently existing benzene storage vessels would be reduced from 3,130 Mg to 680 Mg with the adoption of the proposed standard for benzene storage vessels.

The proposed standard would reduce the national benzene emissions with no potential continuous adverse impacts on other aspects of the environment. In addition, there would be no adverse energy impacts associated with the proposed standard.

The capital investment required for an existing model plant to comply with the proposed standard would range from about $33,000 to about $220,000. The net annualized cost, taking into account the value of benzene saved, would range from about $5,000 to about $29,000. The total national capital and annualized costs for existing facilities would be $11 million and $1.6 million, respectively. The price of benzene would increase by a maximum of about 0.1 percent as a result of the proposed standard. No plants are projected to close as a result of implementing the proposed standard.

The capital cost for a new model plant to comply with the proposed standard would range from about $28,000 to about $120,000. The net annualized cost would range from about $2,200 to about $11,000. The total national capital and annualized costs for new facilities constructed through 1985 to comply would be approximately $2.7 million and $260,000 respectively.

Information on Health Effects of Benzene

The Administrator announced in the June 8, 1977, **Federal Register** his decision to list benzene as a hazardous air pollutant under Section 112 of the Clean Air Act. A "hazardous air pollutant" is defined as an "air pollutant to which no ambient air quality standard is applicable and which * * * may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness."

Numerous occupational studies conducted over the past 50 years provide evidence of the health hazards resulting from prolonged inhalation of benzene. Benzene has been recognized since 1900 as a toxic substance capable of causing acute and chronic effects. Benzene attacks the hematopoietic system, especially the bone marrow, and its toxicity is manifested primarily by alterations in the level of the formed elements in the circulating blood (red cells, white cells, and platelets). The degree of severity of these effects ranges from mild and transit episodes to severe and fatal disorders. The mechanism by which benzene produces its toxic effects, although under investigation, is still unknown.

The adverse effects on the blood-forming tissues have been documented in studies of workers in a variety of industries and occupations including the manufacturing and processing of rubber, shoes, rotogravure, paints, chemicals, and more recently, natural rubber cast film. These studies include single-case reports, cross-sectional studies, and retrospective studies of morbidity and mortality among a defined cohort of workers industrially exposed to benzene.

Based on the entire set of these studies, the Administrator concluded that benzene exposure is casually related to a number of blood disorders, including leukemia (a cancer of the blood-forming system).[a] Although the studies which form the basis of this conclusion involve industrial exposure to benzene at higher levels than those found in the ambient air, the Administrator has "made a generic determination that, in view of the existing state of scientific knowledge, prudent public health policy requires that carcinogens be considered for regulatory purposes to pose some finite risk of cancer at any exposure level above zero" (44 FR 58646). Because of the widespread use of benzine, benzine emissions in the ambient air have been determined to result in significant human exposure. For these reasons, exposure to benzene emissions may reasonably be anticipated to result in one or more serious effects that can be expected to lead to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness. Therefore, the Administrator concluded that benzene satisfies the definition of a hazardous air pollutant under Section 112 of the Clean Air Act.

Rationale for Regulating Benzine Storage Vessels

Stationary source categories of benzene emissions include fugitive emissions from petroleum refineries and chemical manufacturing plants, the gasoline marketing system, process vents at several types of chemical manufacturing plants, coke oven byproduct plants, and benzene storage and handling facilities.

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[a] Benzene has been shown to be causally related to various cytopenias (decreased levels of formed element in the circulating blood), aplastic anemia (a non-functioning bone marrow), and potentially inheritable chromosomal aberrations.

The first step in establishing standards for benzene emissions was to determine which of the source categories emitting benzene would be regulated. Although a pollutant such as benzene may be considered for regulation under Section 112 of the Clean Air Act because emissions from a particular source category pose a significant risk, other source categories may also emit the pollutant in lesser amounts. This may occur, for example, because the source categories process very little of the substance, because the substance is present in only trace amounts in the sources' raw materials, or because the sources have installed adequate controls on their own initative or in response to other regulatory requirements.

Currently, there are 143 petroleum refineries, chemical plants, and bulk storage terminals that store benzene. At these facilities benzene is stored in either fixed-roof, external floating-roof, or internal floating-roof storage vessels. These storage vessels emit benzene in varying amounts, depending on the type and the size of the storage vessel. Controls are readily available which can significantly reduce benzene emissions from these storage vessels.

There are now about 500 benzene storage vessels in use nationwide. These storage vessels, which include about 180 fixed-roof storage vessels, 30 external floating-roof storage vessels, and 290 internal floating-roof storage vessels, emit an estimated 2,700 Mg/year of benzene. Assuming that all existing fixed-roof storage vessels with capacities greater than 150,000 liters are required to be controlled to the level recommended by the Control Techniques Guideline (CTG) for fixed-roof storage vessels *(Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks)* issued in December 1977 (EPA-450/2-77-036), about 140 of the existing fixed-roof storage vessels will have to be fitted with internal floating roofs. This will reduce the nationwide benzene emissions to about 2,200 Mg/year.

By 1985, using a projected industry growth rate of 5 percent per year, there will be an estimated 168 new benzene storage vessels in use. Assuming that all new storage vessels with capacities greater than about 150,000 liters are controlled to the level required by the New Source Performance Standard (NSPS) for Petroleum Liquid Storage Vessels ("Petroleum Liquid Storage Vessels; Standards of Performance for New Stationary Sources") promulgated on April 4, 1980 (45 FR 23374), the nationwide benzene emissions from new storage vessels will be about 900 Mg/year.

Approximately 85 million people live within 20 kilometers of the 143 existing facilities having benzene storage vessels. This is considered the population "at risk" (i.e., the population exposed to ambient concentrations of benzene due to benzene emissions from these storage vessels). As a result of exposure to these benzene concentrations (assuming that existing storage vessels are controlled to the level recommended by the CTG), it is estimated that the maximum lifetime risk to an individual in the exposed population would be within a range of 1.5×10^{-4} to 1.0×10^{-3}. The maximum lifetime risk is the estimated probability that an individual who is exposed continuously for 70 years to the highest maximum annual average ambient benzene concentration due to benzene emissions from benzene storage vessels, will die from leukemia as a result of exposure to these emissions. In addition, it is estimated that there would be a range of 0.12 to 0.82 deaths per year within this population as a result of exposure to benzene emissions from benzene storage vessels. Although the typical operating life of the facilities that may be affected by the proposed standard is difficult to estimate, a 20-year operating life would be common to these industries. Operating lives of 50 years of more may occur, particularly in the petroleum refining industry. However, operating lives may be less than 20 years for some chemical manufacturing industries. On this basis, the estimated number of deaths which would occur over a 20-year operating life of the 143 existing facilities would range from 2.4 to 16.4.

The ranges presented here include only the uncertainty of estimates made concerning the benzene concentrations to which workers were exposed in the occupational studies of Infante, Aksoy, and Ott, that were the basis for developing the benzene unit risk factor (discussed in Appendix D of "Benzene Emissions from Benzene Storage Tanks—Background Information for Proposed Standards", EPA-450/3-80-034a), and are based on a 95 percent confidence interval that assumes the estimated concentrations are within a factor of two.

However, there are several other uncertainties associated with the estimated number of leukemia deaths that are not quantified in these ranges. The number of deaths were calculated based on an extrapolation of the leukemia risk associated with a presumably healthy white male cohort of workers to the general population, which includes men, women, children, non-whites, the aged, and the unhealthy. Uncertainty also occurs in estimating the benzene levels to which people are exposed in the vicinity of petroleum refineries, chemical plants, and bulk storage terminals. Furthermore, leukemia is the only health effect of benzene considered. Additionally, the benefits to the general population of controlling other hydrocarbon emissions from other emission sources in these plants are not quantified. Finally, these estimates do not include the cumulative or synergistic effects of concurrent exposure to benzene and other substances. As a result of these uncertainties, the number of deaths and the maximum lifetime risk due to the emissions from benzene storage vessels could be overestimated. However, and more importantly, they could just as likely be underestimated for the same reasons.

Based on the magnitude of benzene exposures associated with emissions from this source category, on the resulting estimated maximum individual risks and estimated incidence of fatal cancers in the exposed population for the life of existing sources in the category, on the projected increase in benzene emissions as a result of new sources, and on consideration of the uncertainties associated with these quantitative risk estimated (including the effects of concurrent exposures to other substances and to other benzene emissions), the Administrator finds that benzene emissions from benzene storage vessels create a significant risk of cancer and require the establishment of a national emission standard under Section 112.

The Administrator considered the alternative of taking no action to regulate benzene emissions from benzene storage vessels, and relying instead on the OSHA standard for controlling benzene emissions and standards for controlling volatile organic (VOC) emissions in the State Implementation Plans (SIPs). The current OSHA standard stipulates a level of benzene which cannot be exceeded in the work place. However, this work place standard is not expected to result in control of benzene emissions from benzene storage vessels. Consequently, the Administrator rejected reliance on the OSHA benzene standard for control of benzene emissions from benzene storage vessels.

The proposed standard would affect only those vessels storing benzene with a specific gravity within the range of specific gravities specified for Industrial Grade benzene in ASTM–D–836–77, but would affect most benzene storage vessels. Benzene storage vessels are located primarily at petroleum refineries (where 90 percent of benzene is produced), chemical plants, and bulk storage terminals. Most of the benzene produced is ultimately used as a feedstock in the production of chemical intermediates. Production of these intermediates requires essentially pure benzene (i.e., benzene with specifications equal to or exceeding those for industrial grade benzene) in order to maximize product yield. Thus, because most of the benzene stored at refineries, chemical plants, and bulk storage terminals is destined for chemical intermediate production, which requires essentially pure benzene, limiting the coverage of the standard to pure benzene means that the vast majority of benzene storage vessels will be affected.

Benzene is stored in storage vessels with a very wide range of sizes including some very small vessels at facilities such as research laboratories. The control technology required by the proposed standard is not applicable to vessels of this small size. In addition, the amount of benzene emissions from this type of facility is negligible. As a result, it was determined that a lower cutoff limit should be established for this standard. Survey data indicate that 4 cubic meters is the smallest storage vessel used at petroleum refineries, chemical plants, and bulk storage terminals. The equipment required by the standard can be used to control emissions from storage vessels of this size. In addition, setting a cutoff limit at this level would exempt the very small storage vessels at facilities such as research laboratories. For these reasons, the Administrator selected 4 cubic meters as the lower cutoff limit for this standard.

Selection of Regulatory Alternatives

There are basically three different types of vessels used for storing benzene: fixed-roof storage vessels, external floating-roof storage vessels, and internal-floating roof storage vessels. A fixed-roof storage vessel, which generally consists of a cylindrical steel shell with a permanently-affixed roof, is designed to operate at a slight internal pressure above or below atmospheric pressure. Consequently, the emissions from this type of storage vessel can be appreciable.

An external floating-roof storage vessel, rather than having a permanently-affixed roof, has a roof which floats on the surface of the stored liquid, rising and falling with the liquid level. The liquid surface is contacted by the floating roof except in the small annular space between the roof and the wall of the storage vessel where a perimeter seal is used. As a result, the amount of liquid exposed and evaporated to the atmosphere is reduced.

An internal floating-roof storage vessel, the third type of benzene storage vessel, has both a permanently-affixed roof and a roof which floats on the liquid surface (contact roof) or is supported on pontoons several inches above the liquid surface (noncontact roof) inside the storage vessel. A noncontact internal floating roof confines a layer of saturated vapor to a small space above the liquid surface. A contact internal floating roof further reduces evaporation by eliminating the vapor space.

There are basically three methods available for reducing benzene emissions from benzene storage vessels. The first method is to reduce the evaporation of the stored product by eliminating all or part of the vapor space above the liquid surface. One way this can be accomplished is by using a roof and seal combination which floats directly on the liquid surface, thereby eliminating evaporation by restricting vapor formation. It can also be accomplished, although less effectively, by using a roof and seal combination which is supported by pontoons several inches above the liquid surface. This combination reduces emissions by confining the vapors to a small space above the liquid surface.

The second general method available for reducing benzene emissions from storage vessels is to collect the vapors as they evolve and either recover them (e.g., carbon adsorption) or destroy them (e.g., thermal oxidation). There has been little commercial operating experience using vapor control systems to reduce benzene emissions. However, these systems have been demonstrated with other organic vapors and, based on technology transfer, it is believed these systems can be used to control benzene vapors from benzene storage vessels.

The last method available for reducing emissions from benzene storage vessels involves prohibiting the storage of benzene in storage vessels.

The relative effectiveness of different combinations of floating roofs and seals in reducing benzene emissions from benzene storage vessels was recently evaluated in a study conducted for EPA. This study, which was conducted on a 6-meter (20-foot) diameter storage vessel containing benzene, evaluated the effectiveness of five roof and seal combinations including: (1) an external floating roof with a metallic shoe primary seal; (2) an externalfloating roof with a metallic shoe primary seal and a rim-mounted secondary seal; (3) a noncontact internal floating roof with shingled, vapor-mounted primary and secondary seals; (4) floating contact internal floating roof with a liquid-mounted primary seal; and (5) a contact internal floating roof with a liquid-mounted primary seal and a continuous secondary seal.

The test results from this study support engineering judgment that the emissions from a fixed-roof storage vessel can be reduced by converting it to an internal floating roof storage vessel. They also demonstrate that the emissions from an external floating-roof storage vessel can be reduced by installing a secondary seal over the primary seal. Larger reductions of the emissions can be achieved by converting the external floating-roof storage vessel to an internal floating-roof storage vessel. This would involve the installation of a fixed roof over the floating roof. The tests also indicate that the emissions from an internal floating-roof storage vessel can be reduced by using a contact internal floating roof with a liquid-mounted primary seal rather than a noncontact internal floating roof with shingled, vapor-mounted primary and secondary seals. The installation of a secondary seal on a contact internal floating roof results in even less emissions.

The emissions from each type of storage vessel could be further reduced by using a system to collect and either recover or destroy the vapors. Using such a system to control the emissions from an external floating-roof storage vessel would require that a fixed roof be installed over the floating roof.

The emissions from all three types of storage vessels could be altogether eliminated by prohibiting the storage of benzene in storage vessels.

In order to evaluate the environmental, energy, and economic impacts associated with the implementation of standards for both new and existing benzene storge vessels, regulatory alternatives were developed by applying the emissions control techniques in increasing stringency to each type of storage vessel. These regulatory alternatives were then applied to several different model plants which were developed to represent new and existing benzene producers, consumers, and bulk storage terminals.

The baseline for comparison of the alternatives for existing storage vessels assumes that all fixed-roof storage vessels with capacities greater than 150,000 liters storing volatile petroleum liquids such as benzene have internal floating roofs as recommended by the Control Techniques Guideline (CTG) for fixed-roof storage vessels (*Control of Volatile Organic Emissions from Storage of Petroleum Liquids in Fixed-Roof Tanks*) issued in December 1977 (EPA-450/2-77-036). The CTG does not recommend controlling storage vessels with capacities less than 150,000 liters, which are generally fixed-roof storage vessels; therefore, they are assumed to be uncontrolled. The regulatory alternatives for existing sources are summarized below.

Regulatory Alternative I would require that each fixed-roof storage vessel have either a contact or a noncontact internal floating roof. This alternative would affect only fixed-roof storage vessels.

Regulatory Alternative II, in addition to the equipment required in Regulatory Alternative I, would require that each external floating-roof storage vessel have both primary and secondary seals.

Regulatory Alternative III would require that each storage vessel have a fixed roof and a contact internal floating roof with a liquid-mounted primary seal.

Regulatory Alternative IV would require that each storage vessel have a fixed roof and a contact internal floating roof with a liquid-mounted primary seal and a continuous secondary seal.

Regulatory Alternative V would require the use of vapor control systems. Two types of vapor control systems have been evaluated including carbon adsorption systems (Alternative V(A)) and thermal oxidation systems (Alternative V(B)).

Regulatory Alternative VI, the most stringent alternative, would prohibit the storage of benzene in existing storage vessels.

The baseline for comparison of the alternatives for new storage vessels is the New Source Performance Standard (NSPS) for petroleum liquid storage vessels ("Petroleum Liquid Storage Vessels; Standards of Performance for New Stationary Sources") promulgated on April 4, 1980 (45 FR 23374). This NSPS requires that each storage vessel constructed after May 18, 1978, which has a capacity greater than about 150,000 liters have either (1) an external floating roof with primary and secondary seals, or (2) a fixed roof and an internal floating roof. Storage vessels with capacities less than 150,000 liters, generally fixed-roof storage vessels, are unaffected by the NSPS. The regulatory alternatives for new sources are summarized below. These alternatives are identical to those for existing sources except for Alternative II. Because the baseline for new sources assumes more control than that for existing sources, Alternative II for existing sources is not applicable to new sources. Consequently, Alternative II for new sources is identical to Alternative III for existing sources, Alternative II for new sources is identical to Alternative IV for existing sources, etc.

Regulatory Alternative I would require that each fixed-roof storage vessel have either a contact or a noncontact internal floating roof.

Regulatory Alternative II would require that each storage vessel have a contact internal floating roof with a liquid mounted primary seal.

Regulatory Alternative III would require that each storage vessel have a contact internal floating roof with a liquid-mounted primary seal and a continuous secondary seal.

Regulatory Alternative IV would require the use of vapor control systems such as carbon adsorption (Alternative IV(A)) or thermal oxidation (Alternative IV(B)).

Regulatory Alternative V would prohibit the storage of benzene in new storage vessels.

As for existing storage vessels, the most stringent regulatory alternative for new storage vessels is the alternative which prohibits the storage of benzene in storage vessels. Prohibiting the storage of benzene in storage vessels would mean that benzene production and consumption would have to be coordinated so that all benzene would be used immediately after being produced. Such coordination between production and consumption would be very difficult to achieve in practice, especially where the production and consumption facilities are remote from each other. To avoid this problem it is possible that an owner or operator requiring benzene as a feedstock would use an alternate feedstock. However the reasonableness of a requirement which would result in the use of alternate feedstocks is more appropriately evaluated when developing standards for petroleum refineries and individual chemical processes. As a result, the Administrator did not further consider this alternative in developing a standard for either new or existing benzene storage vessels.

Selection of Basis of Proposed Standard—Existing Sources

The basis of the proposed standard for benzene emissions from benzene storage vessels was selected using a two-step process. First, the Administrator examined the regulatory alternatives and selected the one which represents best available technology (BAT) considering the environmental, energy, and economic impacts. After a regulatory alternative was selected as BAT, the Administrator examined the estimated risks remaining after the application of BAT to determine whether they are unreasonable in view of the health benefits and costs, economic impacts, and other impacts that would result if a more stringent alternative was selected.

Selection of Best Available Technology

The environmental, energy, and economic impacts considered in the selection of BAT for existing benzene storage vessels are summarize below.

Environmental Impacts

The national baseline emissions from existing benzene storage vessels are estimated to be approximately 2,200 Mg/year. Regulatory Alternative I would reduce the national benzene emissions from benzene storage vessels by less than 1 percent. Regulatory Alternative II would reduce the national storage vessel emissions by 9 percent to 2,000 Mg/year. Regulatory Alternative III would reduce the national storage vessel emissions by 61 percent to 850 Mg/year. Regulatory Alternative IV would reduce the national emissions to 510 Mg/year. This is a 77 percent reduction of the national baseline emissions from benzene storage vessels. Regulatory Alternative V(A) (carbon adsorption) would reduce the national baseline emissions by 81 percent to 420 Mg/year. Alternative V(B) (thermal oxidation) would reduce the national baseline emissions by 85 percent to 320 Mg/year.

Alternatives I through V would all have potential adverse environmental impacts associated with them. Two adverse environmental impacts associated with all of these regulatory alternatives would be benzene emissions and benzene-contaminated water resulting from the emptying and degassing of storage vessels being inspected or being retrofitted with the required control equipment. These releases would have short-term impacts, however, and the emissions resulting from these operations would be more than offset over time by the emissions reduction associated with the use of the control equipment.

Other adverse environmental impacts would result from use of a thermal oxidation system (Alternative V(B)). These impacts are associated with the use of natural gas or fuel oil to fire a thermal oxidation unit. A thermal oxidation unit which uses either of these as supplemental fuel will produce oxides of nitrogen (NO$_x$). Oxides of sulfur (SO$_x$) would also be produced with the use of fuel oil. The emissions from a typical thermal oxidation unit could be as large as 15,000 kilograms per year (kg/year) of (SO$_x$) and 6,000 kg/year of NO$_x$.

There could also be some impacts on water quality associated with the use of carbon adsorption or thermal oxidation vapor control systems. One source of benzene-contaminated wastewater common to both types of vapor control systems is a water seal, which is used to assure that flashbacks do not propagate from the vapor control unit to the rest of the piping system. The quantity of water used in two water seals, which would be necessary to ensure safe operation of either system, would average approximately 5,700 liters per day. This would normally be sent to the plant wastewater system for treatment and disposal.

Carbon adsorption vapor control systems can have an additional source of water pollution. In a steam-regenerated carbon adsorption system, steam circulating through the carbon bed heats the carbon and raises the vapor pressure of the recovered benzene. The benzene evolved in this process is removed along with the steam, and the steam-benzene mixture is condensed and decanted. The benzene is returned to storage while benzene-contaminated water (as much as 2,000 liters per day) is sent to the plant wastewater system for treatment and disposal.

Only Alternative V(A), which involves the use of a carbon adsorption vapor control system, will likely result in any solid waste disposal impacts. The only potential impact is associated with the handling of spent carbon from the adsorption unit. Typically, the spent carbon, which is normally replaced approximately once every 10 to 15 years, is transported to a facility for reclamation and reactivation. There would be no solid waste impact associated with this operation. However, this material could be disposed of in a landfill which would result in a solid waste disposal impact. Because the owner or operator of a carbon adsorption unit will most likely choose to have the carbon reclaimed and reactivated, no impact on solid waste disposal in expected with the use of a carbon adsorption system.

Energy Impacts

There would be a slight energy benefit associated with Alternatives I through IV because the control of benzene emissions from benzene storage vessels would offset the need for companies to increase their production levels of benzene.

There would also be a slight energy benefit associated with these alternatives in terms of the benzene emissions saved. Alternatives I and II would save benzene emissions equivalent in energy to about 120 barrels and 1,400 barrels of crude oil, respectively. Alternatives III and IV would save benzene emissions equivalent in energy to about 9,200 barrels and 12,000 barrels of crude oil, respectively.

The only regulatory alternative which would involve the use of energy is the alternative which requires that each storage vessel be fitted to a vapor control system, such as a cabron adsorption system (Alternative V(A)) or a thermal oxidation system (Alternative V(B)). The use of a carbon adsorption system would require electricity to power blowers for collecting and transferring the air-benzene vapor mixture from each storage vessel to the carbon adsorption unit. Low pressure steam would be required to regenerate the carbon bed. Assuming that each facility with benzene storage vessels uses a steam-regenerated carbon adsorption system, the total national energy consumption associated with this alternative would be approximately 0.5 petajoules per year (PJ/yr). This is equivalent in energy to about 83,000 barrels of crude oil.

If the benzene emissions saved (12,000 equivalent barrels of crude oil) are taken into account, the national energy consumption would be equivalent to approximately 71,000 barrels of crude oil.

Use of a thermal oxidation system to reduce benzene vapors would also require electricity to power blowers for collecting and transferring the air-benzene vapor mixture. Supplemental fuel (e.g., natural gas) would also be required to ignite and sustain the combustion process. The total national energy consumption associated with this alternative would be approximately 0.6 PJ/yr (100,000 equivalent barrels of crude oil), assuming each facility uses a thermal oxidation system. Because no benzene is recovered or saved in the thermal oxidation process, there is no crude oil savings to offset the energy required to operate this type of vapor control system.

Economic Impacts

The economic impacts associated with each of the regulatory alternatives have been estimated using first-quarter 1979 dollars. The total national capital and net annualized costs, including solvent credit, for Alternative I are \$240,000 and \$70,000, respectively. The increase in the price of benzene associated with this alternative would be less than 0.02 percent.

The total national capital and net annualized costs of Alternative II would be approximately \$540,000 and \$42,000, respectively, and the price increase of benzene would be less than 0.02 percent.

The total national capital and net annualized costs of Alternative III would be approximately \$7.3 million and \$970,000, respectively, and the largest price increase of benzene would be approximately 0.06 percent.

Regulatory Alternative IV would require a total national capital cost of \$11 million and a total net annualized cost of \$1.6 million. The largest expected price increase of benzene associated with this alternative would be approximately 0.1. percent.

Regulatory Alternative V(A) (carbon adsorption) would require a total national capital cost of \$35 million and a total net annualized cost of \$10 million. The largest expected price increase of benzene would be approximately 0.8 percent. Regulatory Alternative V(B) (thermal oxidation) would require a total national capital cost of \$29 million and a total net annualized cost of \$9.3 million. These costs would result in a benzene price increase of approximately 0.7 percent.

In selecting best available technology (BAT) for existing sources, the Administrator examined the regulatory alternatives to determine the most advanced level of control adequately demonstrated considering the economic, energy, and environmental impacts and the technological problems associated with retrofit. The Administrator first considered the most stringent regulatory alternative, Alternative V, which would require that each storage vessel be fitted to a vapor control system. Because Alternative V(B) would provide more emissions reduction than Alternative V(A) with less economic impact, the Administrator considered Alternative V(B) rather than V(A) in selecting BAT. This is the most advanced level of control which could be required short of prohibiting the storage of benzene, and would reduce the national benzene emissions from existing storage vessels from 2,200 Mg/yr to 320 Mg/yr.

This alternative would result in a capital cost of \$29 million, an annualized cost of \$9.3 million, and a price increase of 0.7 percent. In addition, this alternative is the only alternative considered which has any potential continuous adverse energy and environmental impacts. Because of the magnitude of the capital and annualized costs associated with this alternative and the fact that the use of vapor control systems would result in the use of energy and would impact other environmental media, the Administrator examined Regulatory Alternative IV before selecting BAT.

Regulatory Alternative IV would require that each storage vessel have a contact internal floating roof, a liquid-mounted primary seal, and a continuous secondary seal. This alternative represents the next less stringent level of control to that of Regulatory Alternative V, and would reduce the national benzene emissions to 510 Mg/yr. The various components of the equipment required by this alternative are in widespread commercial use, being used in many storage vessels. The national capital cost for Alternative IV would be about $11 million, the annualized cost would be about $1.6 million, and the price increase would be about 0.1 percent. Alternative IV would result in a small but positive energy impact and would have no potential continuous adverse environmental impacts.

The Administrator considered Alternatives V and IV and their economic impacts before selecting BAT. Regulatory Alternative V(B) would reduce the benzene emissions by an additional 8 percent in comparison to Regulatory Alternative IV. However, in contrast to this impact, Regulatory Alternative V(B) would result in much greater costs, economic, energy, and environmental impacts. For example, the capital cost of Alternative V(B) is three times higher and the annualized cost is six times higher for Alternative V(B) than for Alternative IV. Also, the percent price increase is as much as seven times higher. Thus, because the additional emissions reduction associated with Regulatory Alternative V(B) is small in comparison to that for Regulatory Alternative IV and the economic, energy, and secondary environmental impacts associated with Regulatory Alternative V(B) are grossly disproportionate to the emissions reduction in comparison to those for Regulatory Alternative IV, the Administrator selected Regulatory Alternative IV as BAT. Alternative IV would result in a significant emissions reduction at a reasonable cost, a small positive energy impact, and no potential continuous adverse environmental impacts. In addition, the small increase in emissions reduction and the sharp decreases in economic and cost impacts observed when comparing Alternative V(B) with Alternative IV, does not exist when comparing Alternative IV with the next less stringent alternative.

Consideration of Unreasonable Risk and Selection of the Level of the Standard

After the application of BAT (Alternative IV) to existing benzene storage vessels, it is estimated that there would be 0.03 to 0.20 deaths per year due to benzene emissions from these storage vessels. Assuming that a typical facility has an operating life of 20 years as discussed in "Rationale for Regulating Benzene Storage Vessels", the estimated number of deaths which would occur over a 20-year operating life of the 143 existing facilities would range from 0.60 to 4.0. The maximum lifetime risk to the most exposed population after the application of BAT would range from 2.7 × 10^{-6} to 1.9 × 10−4. These numbers include benzene emissions from benzene storage vessels only and not other possible sources of emissions where these storage vessels are located. Alternative V, the next more stringent alternative than BAT, would require the use of vapor control systems. If thermal oxidation systems were used, the estimated residual incidence would range from 0.02 to 0.11 deaths per year. Assuming that a typical facility has a 20-year operating life, the estimated number of deaths which would occur over a 20-year operating life of the 143 existing facilities would range from 0.40 to 2.2. The maximum lifetime risk after the application of BAT wouldf range from 4.1 × 10^{-6} to 2.9 × 10−4. However, requiring the use of vapor control systems would increase the total capital cost from $11 million to $29 million and the total annualized cost from $1.6 million to $9.3 million. It could also result in adverse impacts on air quality, water quality, and energy consumption. In view of the relatively small health benefits that would be gained with the additional costs and the potential adverse environmental impacts associated with the use of vapor control systems, the Administrator determined that the risks remaining after applying BAT to existing storage vessels are not unreasonable. The Administrator determined, therefore, that the standard for existing benzene storage vessels should be based on BAT (Alternative IV).

Selection of Basis of Proposed Standard—New Sources

Selection of Best Available Technology

The environmental, energy, and economic impacts considered in the selection of BAT for new benzene storage vessels are summarized below. An estimated 168 new benzene storage vessels will be constructed through 1983. The number of new storage vessels was estimated by multiplying the number of new plants expected to be built through 1985 by the number of storage vessels in each model plant. Because new plants are expected to be the same size as existing plants, the number of storage vessels in each new model plant is the same as the number in each existing model plant. However, because there are fewer new plants than existing plants, the national impacts differ.

Environmental Impacts

The national baseline emissions from new benzene storage vessels are estimated to be approximately 930 Mg/year in 1985. Regulatory Alternative I would reduce the 1985 national baseline emissions from new storage vessels by about 1 percent to 920 Mg/year. Total national emissions in 1985 would be reduced by Regulatory Alternative II to approximately 290 Mg/year. This is a 69 percent reduction of the national baseline emissions from new sources in 1985. National emissions from new storage vessels in 1985 would be reduced to 170 Mg/year by Alternative III. This is an 82 percent reduction of the 1985 national baseline emissions. Regulatory Alternative IV(A) (carbon adsorption) would reduce the national baseline emissions by 85 percent to 140 Mg/year. Alternative V(B) (thermal oxidation) would reduce the national baseline emissions by 88 percent to 110 Mg/year.

The potential adverse environmental impacts associated with the various alternatives for new sources are similar to those discussed in "Selection of Basis of Proposed Standard-Existing Sources," and are not repeated here.

Energy Impacts

There would be a slight energy benefit associated with Alternatives I through III because the control of benzene emissions from benzene storage vessels would offset the need for increasing tthe production levels of benzene.

There would also be a slight energy benefit associated with these alternatives in terms of the benzene emissions saved. Alternative I would save benzene emissions equivalent in energy to about 66 barrels of crude oil. Alternatives II and III would save benzene emissions equivalent in energy to about 4,400 barrels of crude oil.

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*The maximum lifetime risk associated with Alternative V is greater than that associated with Alternative IV because in Alternative V the benzene emissions from all storage vessels at a plant are discharged from a single stack, whereas in Alternative IV, the emissions are discharged from individual storage vessels and are, therefore, more dispersed.

The only regulatory alternatives having any energy impacts are those which require that each storage vessel be fitted to a carbon adsorption or thermal oxidation vapor control system (Regulatory Alternatives IV(A) and IV(B), respectively). The bases of these impacts are discussed in "Selection of Basis of Proposed Standard-Existing Sources" and are not repeated here. However, because the number of new plants affected by the proposed standard is different than the number of existing plants, the national energy impacts differ. The total national energy consumption in 1985 for either of these alternatives would be approximately 0.2 petajoules per year (PJ/yr). This is equivalent in energy to about 33,000 barrels of crude oil. The national energy consumption associated with Alternative IV(A) would be equivalent to approximately 28,000 barrels of crude oil after taking into account the benzene emissions saved (5,400 equivalent barrels of crude oil). The national energy consumption associated with Alternative IV(B) would be equivalent to approximately 33,000 barrels of crude oil, because there are no savings resulting from the use of a thermal oxidation system.

Economic Impacts

The economic impacts associated with each of the regulatory alternatives have been estimated using first-quarter 1979 dollars. The total national capital and net annualized costs, including solvent credit, associated with Regulatory Alternative I would be approximately $73,000 and $20,000, respectively. The increase in the price of benzene due to this alternative would be less than 0.02 percent.

In order to comply with Regulatory Alternative II, the industry would incur total capital and net annualized costs of approximately $1.7 million and $99,000, respectively. This would result in a price increase of benzene of approximately 0.05 percent.

Regulatory Alternative III would result in total national capital and net annualized costs of $2.7 million and $260,000, respectively. This alternative would result in a price increase of benzene of less than 0.1 percent.

Regulatory Alternative IV(A) (carbon adsorption) would require a total national capital cost of $12 million and a net annualized cost of $3.3 million. The largest expected price increase of benzene associated with this alternative would be approximately 0.8 percent. Regulatory Alternative IV(B) (thermal oxidation) would require a total national capital cost of $9.5 million and a net annualized cost of $3.1 million. The resulting benzene price increase would be approximately 0.7 percent.

In selecting best available technology (BAT) for new sources, the Administrator examined the regulatory alternatives to determine the most advanced level of control adequately demonstrated, considering the economic, energy, and environmental impacts. The Administrator first considered the most stringent regulatory alternative, Alternative IV, which would require that each storage vessel be fitted to a vapor control system. Because Alternative IV(B) would provide more emissions reduction than Alternative IV(A) with less economic impact, the Administrator considered Alternative IV(B) rather than Alternative IV(A) in selecting BAT. This would be the most advanced level of control which could be required without prohibiting the construction of new benzene storage vessels, and would reduce the national benzene emissions from new storage vessels in 1985 from 930 Mg/yr to 110 Mg/yr.

This alternative would result in a capital cost of $9.5 million, an annualized cost of $3.1 million, and a price increase of 0.7 percent. In addition Alternative IV(B) is the only alternative considered which has any potential continuous adverse energy and environmental impacts. Because of the magnitude of the capital and annualized costs for Alternative IV(B) and the fact that the use of vapor control systems would result in the use of energy and would impact other environmental media, the Administrator examined Regulatory Alternative III before selecting BAT.

Regulatory Alternative III would require that each storage vessel have a contact internal floating roof, a liquid-mounted primary seal, and a continuous secondary seal. This alternative represents the next less advanced level of control to that of Regulatory Alternative IV and would reduce the national benzene emissions in 1985 to 170 Mg/yr. The various components of the equipment required by this alternative are in widespread commercial use, being used in many storage vessels. The capital cost for Alternative III would be about $2.7 million, the annualized cost would be about $260,000, and the price increase would be about 0.1 percent. Alternative III would result in a small but positive energy impact and would have no potential continuous adverse environmental impacts.

The Administrator considered Alternatives IV and III and their economic impacts before selecting BAT. Regulatory Alternative IV(B) would result in an additional 6 percent emission reduction compared with Regulatory Alternative III. However, in contrast to these impacts, Regulatory Alternative IV(B) would result in much greater economic, energy, and environmental impacts. For example, the capital cost of Alternative IV(B) is four times higher and the annualized cost is 12 times higher for Alternative IV(B) than for Alternative III. Also, the percent price increase of benzene is 7 times higher. Thus, because the additional emissions reduction associated with Regulatory Alternative IV(B) is small in comparison to that for Regulatory Alternative III and the economic, energy, and secondary environmental impacts associated with Regulatory Alternative IV(B) are grossly disproportionate to the emissions reduction in comparison to those for Regulatory Alternative III, the Administrator selected Regulatory Alternative III as BAT. Alternative III would result in a significant emissions reduction at a reasonable cost, a small positive energy impact, and no potential continuous adverse environmental impacts. In addition, the small increase in emissions reduction and the sharp decrease in economic and cost impacts observed when comparing Alternative IV(B) with Alternative III, do not exist when comparing Alternative III with the next less stringent alternative.

Consideration of Unreasonable Risk and Selection of the Level of the Standard

The proposed "Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer" (44 FR 58642) includes certain requirements for the siting of new sources. These are not implemented in the proposed standard because the details of the procedures have not been formulated. New source siting requirements for storage vessels may be proposed in the future, but would only apply to new sources constructed, modified, or reconstructed after the proposal date of such siting requirements.

For new sources constructed, modified, or reconstructed in the interim, the Administrator is making a judgment on whether the estimated risks remaining after the application of BAT selected for new sources are not unreasonable in view of the health benefits and costs, economic impacts, and other impacts that would result if a more stringent alternative were selected. In making this judgment, the approach of estimating the residual risks was based on estimates of benzene emissions from new storage vessels and on the assumption that population distributions around new storage vessels would be similar to those around existing storage vessels. The Administrator decided to use this approach because it seems the most reasonable approach in the absence of new source siting requirements.

No information is available on the future location of new storage vessels or the number of people which will be exposed to the emissions from them. They could be located at existing plant sites or entirely new sites. There is no available information to indicate that population distributions around new storage vessels will be greater or less than they are for existing storage vessels. Therefore, for purposes of estimating deaths due to emissions from new storage vessels, it was assumed that the population distributions would be the same as they are for existing storage vessels. Therefore, residual deaths were calculated for new storage vessels by using the growth projections for new storage vessel capacity and assuming the population distributions were the same for new storage vessels as for existing storage vessels. Even if the new storage vessels were added at existing plant sites, this would be an accurate assumption because the people living in the vicinity of these plants would be exposed to additional emissions and because a linear dose-response model was used to calculate deaths.

In calculating the residual maximum lifetime risk after the application of BAT to new storage vessels, it is reasonable to assume that exposures around new plant sites would be no greater than they are around existing plant sites. They could be greater if new storage vessels were added to the existing plant site associated with the maximum lifetime risk for existing sources. However, because there is no information indicating that this will occur, it was assumed that the maximum lifetime risk associated with new storage vessels would be no greater than that for existing storage vessels.

Using the assumptions discussed above, it is estimated that 0.01 to 0.07 deaths per year would occur in 1985 due to benzene emissions from new storage vessels after the application of BAT. Maximum lifetime risk to the most exposed population after the application of BAT would range from 2.7×10^{-6} to 1.9×10^{-4}. These numbers include benzene emissions from storage vessels only and not other possible sources of emissions where benzene storage vessels are located. Alternative IV, the next more stringent alternative than BAT, would require the use of vapor control systems. If thermal oxidation systems were used, the estimated residual incidence would range from 0.01 to 0.04 deaths per year and the maximum lifetime risk would range from 4.1×10^{-6} to 2.9×10^{-4}.[8] However, requiring the use of vapor control systems would increase the total capital costs from $2.7 million to $9.5 million and the total annualized costs from $0.02 million to $3 million. It could also result in potential adverse impacts on air quality, water quality, and energy consumption. In view of the relatively small health benefits that would be gained with the additional costs and the potential adverse environmental impacts associated with the use of vapor control systems, the Administrator determined that the risks remaining after the application of BAT to new storage vessels are not unreasonable. Consequently, the Administrator determined that the standard for new benzene storage vessels should be based on BAT.

Selection of Format for the Proposed Standard

In Section 112 of the Clean Air Act, the Administrator is required to prescribe an emission standard whenever it is feasible. Section 112(e) states that "if in the judgment of the Administrator, it is not feasible to prescribe or enforce an emission standard for control of a hazardous air pollutant or pollutants, he may instead promulgate a design, equipment, work practice, or operational standard, or combination thereof." The term "not feasible" is applicable if the emissions cannot be captured and vented through a vent or stack designed for that purpose or if the application of a measurement methodology is not practicable due to technological or economic limitations.

Establishing an emission standard for storage vessels would require the measurement of emissions from each storage vessel; therefore, the emissions would have to be vented in a manner that would allow the measurement of pollutant concentrations and flow rates. Storage vessels equipped with the control equipment upon which the proposed standard is based do not typically have a conveyance designed to capture the emissions or a stack or vent through which the emissions pass to the atmosphere. Equipping each storage vessel with a capture and stack system would be possible, but would be economically impracticable, especially considering that the sole purpose of the system would be for emissions testing. Another consideration is that the emissions from storage vessels are intermittent and are often at flow rates too low to measure, thereby making emissions measurement technically impracticable. For these reasons, the Administrator has concluded that establishing an emission standard is not feasible for benzene storage vessels.

The possibility of establishing a "design, equipment, work practice, or operational standard, or combination thereof" was then examined. The regulatory alternative upon which the proposed standard is based consists of certain equipment and design specifications. Operational requirements, which consist of inspection and repair requirements, are necessary to insure the continued integrity of the control equipment. Therefore, the Administrator concluded that the format of the standard should include a combination of design, equipment, work practice, and operational standards.

Modification and Reconstruction Considerations

An existing source is one which is constructed, modified, or reconstructed before the proposal date of a standard and a new source is one which is constructed, modified, or reconstructed after the proposal date of a standard. A modification occurs when there is a physical or operational change to a source accompanied by an increase in benzene emissions to the atmosphere. Several exclusions from the modification definition are listed in § 61.01(j) of the General Provisions for hazardous air pollutant standards. Reconstruction occurs when the components of an existing source are replaced to the extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new facility.

Even though the proposed standards for existing and new storage vessels are identical, the Clean Air Act designates different compliance periods for new and existing sources. Existing sources must comply within 90 days of the effective date, but may obtain a waiver of compliance for up to 2 years from the effective date. New sources (including modified and reconstructed sources) must comply with the standard at startup, unless startup occurs before the effective date, in which case they must comply by the effective date.

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[8] The maximum lifetime risk associated with Alternative IV is greater than that associated with Alternative III because in Alternative IV the benzene emissions from all storage vessels at a plant are discharged from a single stack, whereas in Alternative III the emissions are discharged from individual storage vessels and are, therefore, more dispersed.

Storage vessels can be used to store different materials at different times. If an existing storage vessel was being used to store a liquid other than benzene before the proposal date of the standard and is filled with benzene after the proposal dete, the storage vessel would be considered modified and would, therefore, have to comply with the standard just as if it was a new source. An operational change and an increase in benzene emissions would have occurred. If this change in material stored occurred between proposal and promulgation of the standard, the storage vessel would have to be in compliance on the promulgation date of the standard. If this change in material stored occurred after promulgation of the standard, the storage vessel would have to be in compliance with the standard upon filling the vessel with benzene. This is considered reasonable because after proposal of this standard, the owner or operator has been put on notice that he would be subject to the standard prior to filling the vessel with benzene.

Because the proposed standard for existing storage vessels is identical to that for new storage vessels, and existing storage vessel which is reconstructed would have to comply with the same requirements with which it would have to comply had it not been reconstructed. However, the compliance times would be different. Therefore, the proposed standard states that the owner or operator of a source does not have to apply for approval of reconstruction under Section 61.07 of the General Provisions if the source is in compliance with the standard. Because a modification, by definition, involves an emissions increase, a storage vessel is not exempt from Section 61.07 of the General Provisions even if it does comply with the requirements of the standard.

According to the definition of reconstruction which is contained in the proposed standard, there are two criteria which the Administrator will consider in deciding whether a source is reconstructed. The first is whether "the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable, entirely new source." The second is whether "it is feasible, considering economic impacts and the technological problems associated with retrofit, to meet the applicable standard for new sources set forth in this subpart." The second criterion is meaningless after the waiver period with regard to the proposed standard because the standards for new and existing sources are identical. That is, the economic impacts and the technological problems associated with retrofitting existing storage vessels have already been considered, and it has already been decided that existing sources can meet the proposed standard for new sources.

Despite these considerations, both parts of the definition of reconstruction have been retained in the proposed standard because amendments to the General Provisions for Part 61 are currently being developed and will contain this definition. This definition will apply to the subpart for benzene storage vessels as well as other subparts. Except during the waiver period, the second criterion in the definition will be applicable only if in the future the standard for new and existing storage vessels is different. The full definition of reconstruction is included in the proposed standard for comment because it is possible that sometime in the future the standard could be different for new and existing benzene storage vessels.

Selection of Equipment Specifications

The equipment specified as best available technology (BAT) for controlling benzene emissions from new and existing benzene storage vessels was selected largely on the basis of emissions tests conducted for EPA on a 6-meter (20-foot) diameter storage vessel containing benzene. This equipment includes a contact internal floating roof, a liquid-mounted primary seal, and a continuous secondary seal.

The standard would allow the owner or operator of a storage vessel to use other equipment or procedures to reduce benzene emissions from the storage vessel if the equipment or procedure is demonstrated to be equivalent in reducing emissions to that equipment required by the standard. Equivalence could be demonstrated by one of several methods including (1) an actual emissions test which uses a full-size or scale-model sealed storage vessel which accurately collects and measures all benzene emissions from the storage vessel, or (2) an engineering evaluation approved by the Administrator.

Based on information presented in American Petroleum Institute (API) Publication 2517 and on engineering judgment, a metallic shoe seal would be considered an equivalent control device to the liquid-mounted primary seal required by the proposed standard; consequently, a metallic shoe seal would be allowed by the proposed standard. In addition, a vapor control system which is designed to reduce the benzene emissions discharged from a storage vessel at an efficiency of at least 95 percent (by weight) and which is operated at the design specifications to achieve this emissions reduction would be considered an equivalent control system if it is approved by the Administrator, and would be allowed by the proposed standard. This control level has been selected because it provides an approximately equal emissions reduction to the equipment specified by the proposed standard, relative to the emissions from a fixed-roof storage vessel. The efficiency of the vapor control system would be calculated by comparing the controlled emissions to those emissions which would occur from a fixed-roof storage vessel without a vapor control system.

Selection of Initial Inspection and Reporting Requirements

Because direct measurement of the emissions from storage vessels is impracticable, the proposed standard would not require an initial test to determine the emissions from each affected storage vessel. Instead, the standard would require that the owner or operator of each storage vessel submit a report to the Administrator describing the control equipment being used to reduce benzene emissions.

The owner or operator would also be required to inspect and report the condition of the control equipment before filling the storage vessel with benzene. During this inspection the owner or operator would inspect for defects in the internal floating roof and for holes, tears, or other openings in the primary seal, secondary seal, and seal fabric. All defects in the floating roof and seals would have to be repaired before the storage vessel could be filled with benzene. Finally, the standard would require the owner or operator to notify the Administrator at least 30 days in advance of filling the storage vessel with benzene so that the Administrator could have the opportunity to have an observer inspect the control equipment before the storage vessel is filled. This requirement is necessary because it will be infeasible to inspect all the control equipment once the storage vessel is filled.

Control Equipment Failures and Selection of Periodic Inspection and Repair Requirements

As is the case with any control equipment, internal floating roofs and seals can fail, resulting in an increase in emissions from the respective storage vessels. One failure which can occur is the sinking of the internal floating roof. Steel pan internal floating roofs, which rely on liquid displacement for flotation, are especially susceptible to sinking whenever liquid accumulates on the roof surface. Liquid can accumulate on steel pans for several reasons including (1) leaks or holes in the roof; (2) splashing of liquid onto the roof from the improper use of mixers at low liquid levels; (3) tipping of the roof on roof support columns as the roof rises and falls; and (4) tipping of the roof by large vapor bubbles expanding under one section of the roof. Liquid generally accumulates in one location on a steel pan causing an edge to become submerged, which eventually result in the sinking of the roof.

Other types of internal floating roofs may be less susceptible to sinking when liquid accumulates on them. These roofs include: (1) aluminum sandwich panel roofs with a honeycombed aluminum core floating in contact with the liquid, and (2) pan-type steel roofs supported on the liquid by pontoons. Aluminum sandwich panel roofs, because of their rigidity, are susceptible to failure at joints in the roof. This problem is compounded by their light weight, which promotes hangup or jamming as the roof rises and falls inside the storage vessel. Pan-type steel roofs supported by pontoons can sink if several pontoons are punctured. No failure incidence has been recorded for either of these types of roofs. However, their inherent stability dictates that their failure rates should be very low.

Seals, while not subject to abrupt failures like roofs, do deteriorate over time. For example, holes, tears, and other openings can develop in the primary and secondary seals as the seals abrade against the wall of the storage vessel. These openings, which indicate that the seal is in need of repair or replacement, may expose benzene to evaporation, reducing the effectiveness of the seal. If openings develop in a foam-filled primary seal, the foam will absorb the benzene, causing the seal to sag. This reduces the ability of this type of seal to prevent emissions from the rim space. If the primary seal is liquid-filled, openings will allow the liquid to escape, reducing the seal's effectiveness.

Gaps which develop between either the primary seal or the secondary seal and the shell of the storage vessel will also reduce the seal's ability to reduce emissions. Gaps can develop as a result of shell deformations or the inability of a seal to conform to varying gaps because of a loss of seal flexibility.

Emissions tests recently conducted for EPA have indicated that "* * * the condition (tight or gapped) of the primary seal is not as significant if a tight secondary seal is present." Based on data acquired by an air regulatory agency during seal gap inspections on 17 external floating-roof storage vessels and engineering judgment, at least 76 percent of internal floating-roof storage vessels can be expected to have no measurable gap between the secondary seal and the shell of the storage vessel. Of the remaining storage vessels, 18 percent would have tight secondary seals with total gap areas of less than 21.2 cm^2/m (1 in^2/ft) of vessel diameter and 6 percent would have severely gapped secondary seals with gap areas in excess of 212 cm^2/m (10 in^2/ft) of vessel diameter. Severely gapped secondary seals would not be very effective at reducing emissions.

Section 112(e) of the Clean Air Act states that if the Administrator prescribes an equipment standard for control of a hazardous air pollutant such as benzene, he shall "include as part of such standard such requirements as will assure the proper operation and maintenance of any element of * * * equipment." Ideally, it would be preferable to include operation and maintenance procedures in the standard which would prevent control equipment failures. However, no such procedures are available to prevent the type of failures which occur while using the control equipment specified by the proposed standard.

Because control equipment failures cannot be prevented, the next best operation and maintenance procedure is to require that the owner or operator of each storage vessel inspect the integrity of the control equipment and repair any failures. The procedure generally specified in regulations for external floating-roof storage vessels for determining the integrity of primary and secondary seals is to periodically inspect the gaps between the seals and the wall of each storage vessel while the storage vessel is in operation. However, it is not reasonable to require that inspections be conducted in internal floating-roof storage vessels containing benzene because of the benzene health hazard to which inspoectors could be exposed while inside these vessels. In addition, because seal gap data are unavailable to correlate the gaps when a roof is floating with the gas when the roof is on its leg supports, gap criteria cannot be specified for an empty storage vessel. As a result, no quantitative gap measurement criteria can be specified for internal floating-roof storage vessels used for storing benzene.

In lieu of such gap criteria, the owner or operator of each storage vessel could be required to periodically inspect the condition of the floating roof and the secondary seal from the manhole and roof hatches on the fixed roof of each storage vessel. The primary seal would not be visible during such an inspection, however, and could only be inspected from inside the storage vessel, after it had been emptied and degassed. The degassing of a storage vessel, however, produces emissions. For a medium-size storage vessel, these emissions amount to approximately 0.3 Mg each time the vessel is degassed. These emissions could conceivably be controlled through the use of a vapor control system; however, it is both technically and economically impractical to require that a facility maintain such a system to control these intermittent and infrequent emissions. As a result, the Administrator decided not to require the control of degassing emissions.

The next question regarding the inspection of primary seals concerns the frequency of such inspections. These seals have a very low failure rate and, when installed properly, are expected to last many years. In addition, emissions tests conducted for EPA have indicated that the condition of the primary seal has a minimal effect on the emissions when there is a secondary seal above the primary seal. As a result, the emissions associated with frequent degassing may actually exceed those that would be produced by not inspecting the primary seal on a frequent basis.

After considering the expected low incidence of control equipment failures, the degassing emissions that would occur in order to inspect for these failures, and the fact that the secondary seal could be expected to reduce emissions from a primary seal failure, the Administrator decided to require that complete internal inspections of the control equipment be conducted only once every 5 years.

The owner or operator of a benzene storage vessel may find it necessary on an infrequent occasion to empty and degas a storage vessel for reasons other than equipment inspections. In order to further reduce the emissions due to degassing for inspections, the Administrator decided to require an entire inspection from inside the storage vessel any time a storage vessel is degassed for any purpose. The storage vessel would not have to be degassed and inspected again for another 5 years. This would reduce emissions because it would result in only one degassing when two may have occured otherwise, one for a facility need and one for an inspection.

Once a storage vessel has been degassed and inspected, the proposed standard would require that all control equipment failures be repaired before the storage vessel is refilled with benzene. This would not only prevent any further emissions due to control equipment failures, but would also prevent the emissions resulting from a subsequent degassing to repair the failures. Such a requirement is considered reasonable because the inspection and repair program is only required every 5 years and the owner or operator can plan ahead to have the storage vessel out of service long enough to make all necessary repairs.

As discussed previously, at least some failures of the internal floating roof and secondary seal can be detected from roof hatches or manholes in the fixed roof above the internal floating roof. Failures detectable from the fixed roof include defects in or benzene accumulated on the internal floating roof, holes or tears in the secondary seal, and relatively large gaps between the secondary seal and wall of the storage vessel.

The costs of inspecting the internal floating roof and the secondary seal through the roof hatches and manholes would be small (less than 1 person-hour per inspection for the average size storage vessel). However, due to the expected low incidence of equipment failures, requiring very frequent inspections would not be reasonable, even considering the low costs. Therefore, the Administrator decided to require that such inspections be conducted only once every 3 months.

If during a 3-month inspection, the owner or operator finds that there are defects in or benzene accumulated on the floating roof, there are holes or tears in the secondary seal, or there is a visible gap between the secondary seal and the wall of the storage vessel, these failures would have to be repaired. In order to repair these failures, all benzene in the storage vessel would have to be removed and the storage vessel degassed. Once this is done, there would be no additional emissions due to the control equipment failure. For this reason, there is no reason to put a limit on the length of time allowed for repairing control equipment failures. However, it is necessary to place a time constraint on the length of time benzene would be allowed to remain in the storage vessel. The Administrator considered requiring that the benzene be removed immediately after a failure is detected. However, not all facilities could be expected to have extra storage capacity for the displaced benezene. A survey of benzene storage facilities (Docket Number A-80-14, items II-67 through II-70) indicates, however, that most facilities could within 30 days empty a storage vessel having equipment in need of repair. As a result, the Administrator has determined that it is reasonable to require in the proposed standard that the owner or operator of a storage vessel empty the storage vessel within 30 days if a failure is detected during a 3-month inspection. Additionally, the storage vessel could not be refilled with benzene until the failure is corrected.

The emissions and the residual risks used in selecting BAT and the proposed standard for existing and new sources were calculated assuming there would be no emissions due to degassing or control equipment failures. Actually, as discussed in this section, complete prevention of these failures is not possible. Operation and maintenance procedures for minimizing these emissions to the extent possible have been discussed in this section and are required by the proposed standard. In fact, however, the total emissions allowed by the standard include (1) those due to initially degassing existing storage vessels to retrofit them with control equipment, (2) those due to degassing each storage vessel each 5 years for the 5-year inspection, (3) those due to degassing a storage vessel to repair failures detected during the 3-month inspection, (4) those due to unrepaired failures in a primary seal which can be undetected for as long as 5 years, and (5) those due to unrepaired failures in the internal floating roof and secondary seal which can be undetected or unrepaired for as long as 4 months. These emissions allowed by the proposed standard are in addition to those which are released even when the required equipment is in place without defects.

The annual allowable emissions in 1985 resulting from control equipment failures and the degassing of benzene storage vessels meeting the proposed standard is estimated to be about 50 Mg. Little information is available on the expected frequency of such failures. Also, it is difficult to estimate the emissions due to failures such as holes or tears in seals. Furthermore, the emissions rate is dependent on the extent of such a hole or tear. A number of assumptions had to be made in deriving this emission estimate. These assumptions are detailed in Docket Item No. II-B-19.

The residual risks due to all emissions allowed by the proposed standard, including the emissions from equipment failures, were calculated using these emissions estimates. The residual incidence in 1985 with the proposed standard in effect would be increased by 0.003 to 0.020 deaths and the maximum lifetime risk would be increased by 7.6×10^{-6} to 5.3×10^{-5}. These increases are small due to the expected low control equipment failure rate. The only alternatives available for reducing these residual risks are those which would require the use of vapor control systems (Regulatory Alternative V for existing sources and Alternative IV for new sources) and those which prohibit the storage of benzene in storage vessels. The reasons for dismissing the latter alternatives on an across-the-industry basis are discussed in "Selection of Regulatory Alternatives." The costs and risks which would result if vapor control systems were required are discussed in the section entitled "Consideration of Unreasonable Risk and Selection of the Level of the Standard." As was stated there for continuous emissions, in view of the relatively small health benefits that would be gained with the additional costs and the potential adverse environmental impacts associated with the use of vapor control systems, the Administrator determined that the risks remaining after applying BAT for continuous emissions and emissions due to control equipment failures to existing and new storage vessels are not unreasonable.

Impacts of Reporting Requirements

The owner or operator of each storage vessel would be required to submit a report to the Administrator after each inspection conducted in accordance with the requirements of the standard. An initial report would have to be submitted following the first inspection of the storage vessel after the required control equipment has been installed. Periodic reports would also have to be submitted after each 3-month inspection and each 5-year inspection required by the standard. Each of these reports would have to identify each storage vessel which did not meet the requirements of the standard and the reason it did not meet the requirements. In the subsequent quarterly report a description of the steps taken to bring the storage vessel into compliance would have to be included. If the storage vessel has not been emptied or repaired within 30 days after being identified as out of compliance, then an interim report stating this would have to be submitted. If the storage vessel did not contain benzene prior to implementation of the standard, or if the storage vessel had to be emptied and degassed to bring it into compliance with the standard, the owner or operator would have to notify the Administrator at least 30 days prior to filling the storage vessel so the Administrator could have the opportunity to send a representative to inspect the storage vessel prior to its filling. An estimated 10 person-years would be required for the industry to comply with these reporting requirements for all benzene storage facilities through the first 5 years of the regulation.

Public Hearing

A public hearing will be held to discuss the proposed standard for benzene storage vessels in accordance with Sections 112(b)(1)(B) and 307(b)(5) of the Clean Air Act. Persons wishing to make oral presentations regarding the proposed standard for benzene storage vessels should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the ADDRESSES section of this preamble and should refer to docket number A–80–14.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, D.C. (see ADDRESSES section of this preamble).

Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of the proposed standard. The principal purposes of the docket are (1) to allow members of the public and industries involved to identify and locate documents so they can intelligently and effectively participate in the standard setting process, and (2) to serve as the record in case of judicial review.

Miscellaneous

As prescribed in Section 112 of the Clean Air Act, the proposal of this standard has been preceded by the Administrator's determination that benzene is a hazardos air pollutant as defined in Section 112(a)(1) of the Act. Benzene was added to the list of hazardous air pollutants on June 8, 1977.

In accordance with Section 117 of the Act, publication of this proposed standard was preceded by consultation with the appropriate advisory committees, independent experts, and Federal departments and agencies. In addition, members of the benzene task group of the Interagency Regulatory Liaison Group, representing EPA, OSHA, the Food and Drug Administration, and the Consumer Product Safety Commission, have met and reviewed the proposed regulation to ensure that the statement of the rule is jointly understood and is consistent with their programs. The Administrator welcomes comments on all aspects of the proposed standard, including economic and technological issues.

Comments are also specifically invited on the relative effectiveness of contact and noncontact internal floating roofs. Based on engineering judgment, a contact internal floating roof, which eliminates evaporation by restricting vapor formation, is more effective at reducing emissions than a noncontact roof, which reduces emission by confining the vapors to a small space above the liquid surface. Recent emissions tests conducted for EPA have demonstrated that a contact internal floating roof with a liquid-mounted primary seal and a continuous secondary seal is more effective at reducing emissions than a noncontact internal floating roof with shingled, vapor-mounted primary and secondary seals. However, because the roofs tested were equipped with different types of seals, the relative effectiveness of contact and noncontact internal floating roofs cannot be quantified. Any comments submitted to the Administrator on this issue should contain specific information and data pertinent to an evaluation of the issue.

This standard will be reviewed 5 years from the date of promulgation. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods of emission control, enforceability of the standard, improvements in emissions control technology, and reporting requirements. The reporting requirements in this regulation will be reviewed as required in the EPA sunset policy for reporting requirements and regulations.

Dated: December 12, 1980.

Douglas M. Costle,

Administrator.

It is proposed that 40 CFR Part 61 be amended by adding a new Subpart K as follows:

Subpart K—National Emission Standard for Benzene Emissions from Benzene Storage Vessels

Sec.

61.120 Applicability and designation of source.
61.121 Definitions.
61.122 Emission standard and compliance provisions.
61.123 Equivalent equipment and procedures.
61.124 Initial report.
61.125 Periodic reports.

Authority. Secs. 112, 114, and 301(a) of the Clean Air Act as amended (42 U.S.C. 7412, 7414, and 7601(a)), and additional authority as noted below.

Subpart K—National Emission Standard for Benzene Emissions from Benzene Storage Vessels

§ 61.120 Applicability and designation of source.

(a) The source to which this subpart applies is each storage vessel that is storing benzene and that has a storage capacity greater than 4 cubic meters. This subpart does not apply to storage vessels used for storing benzene at coke oven byproduct facilities.

(b) While the provisions of this subpart are effective, a designated source that is also subject to the provisions of 40 CFR Part 60 shall only be required to comply with the provisions of this subpart.

§ 61.121 Definitions.

Terms used in this subpart are defined in the Act, in Subpart A of this part, or in this section as follows:

"Benzene" means benzene having a specific gravity within the range of specific gravities specified for Industrial Grade benzene in ASTM–D–836–77. This specification includes Industrial Grade benzene, Nitration Grade benzene, and Refined benzene–535. (Permission will be sought from the Director of the **Federal Register** to incorporate this ASTM specification by reference.)

"Existing storage vessel" means each storage vessel that stores benzene and that was used to store benzene at any time prior to the proposal date of this standard.

"Fixed capital cost" means the capital needed to provide all the depreciable components.

"Internal floating roof" means a cover that rests upon the liquid surface inside a storage vessel having a permanently-affixed roof.

"Liquid-mounted seal" means a foam- or liquid-filled primary seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continuously around the circumference of the storage vessel.

"Metallic shoe seal" includes, but is not limited to, a metal sheet held vertically against the wall of the storage vessel by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annual space between the metal sheet and the floating roof.

"New storage vessel" means each storage vessel that is initially filled with benzene after the proposal date of this standard. Included are each vessel newly constructed and each vessel constructed prior to the proposal date of this standard.

"Primary seal" means the lower seal forming a continuous closure between the wall of the storage vessel and the internal floating roof.

"Reconstruction" means the replacement of components of an existing source to such an extent that:

(a) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable, entirely new source; and

(b) It is feasible, considering economic impacts and the technological problems associated with retrofit, to meet the applicable standard for new sources set forth in this subpart.

"Secondary seal" means the upper seal forming a continuous closure between the wall of the storage vessel and the internal floating roof.

"Storage vessel" means each tank used for the storage of benzene.

§ 61.122 Emission standard and compliance provisions.

(a) The owner or operator of each storage vessel to which this subpart applies shall reduce benzene emissions to the atmosphere by meeting the following equipment and procedural requirements, or equivalent as provided in § 61.123.

(1) The owner or operator shall equip each storage vessel with a fixed roof in combination with an internal floating roof meeting the following specifications:

(i) The internal floating roof shall rest on and be in direct contact with the surface of the benzene liquid inside the storage vessel at all times, except during initial fill and those intervals when the storage vessel is completely emptied and subsequently refilled.

(ii) Each opening in the internal floating roof, except for automatic bleeder vents and leg sleeves, shall be equipped with a cover, seal, or lid which is in a closed position at all times (i.e., no visible gap), except when the device is in actual use. Automatic bleeder vents are to be closed at all times when the roof is floating, except when the roof is being floated off or is being landed on the roof leg supports.

(2) The owner or operator shall equip each storage vessel with a continuous closure device between the wall of the storage vessel and the edge of the internal floating roof. The closure device is to consist of a liquid-mounted seal and a secondary seal.

(b) The owner or operator of each storage vessel shall meet the requirements of paragraph (a) of this section, as follows:

(1) The owner or operator of each existing benzene storage vessel shall meet the requirements of paragraph (a) of this section no later than 90 days after the effective date, unless a waiver of compliance has been approved by the Administrator in accordance with § 61.11.

(2) The owner or operator of each new benzene storage vessel shall meet the requirements of paragraph (a) of this section prior to filling the storage vessel with benzene; except that if the storage vessel was filled with benzene between the proposal date of the regulations and the effective date, the owner or operator shall meet the requirements of paragraph (a) of this section on the effective date.

(c) The owner or operator of each storage vessel to which this subpart applies shall meet the following requirements after installing control equipment to comply with § 61.122(a):

(1) Visually inspect the internal floating roof, the primary seal, and the secondary seal prior to filling the storage vessel with benzene.

(i) If the owner or operator finds holes, tears or other openings in the primary seal, the secondary seal, or the seal fabric, or defects in the internal floating roof, or both, the owner or operator shall repair the items before filling the storage vessel.

(2) Visually inspect the internal floating roof and the secondary seal through manholes and roof hatches on the fixed roof at least once every 3 months.

(i) If the owner or operator finds that there is benzene accumulated on or defects in the internal floating roof, the internal floating roof is not resting on and in direct contact with the surface of the benzene liquid inside the storage vessel, there are visible gaps between the secondary seal and the wall of the storage vessel, or there are holes, tears, or other openings in the secondary seal or the seal fabric, the owner or operator shall repair the items or empty the storage vessel within 30 days.

(3) Visually inspect the internal floating roof, the primary seal, and the secondary seal whenever the storage vessel is emptied and degassed, but at least once during each 5 year period after installing control equipment to comply with § 61.122(a).

(i) In the case of the periodic 5-year inspection, notify the Administrator in writing at least 30 days prior to the refilling of each storage vessel to afford the Administrator the opportunity to have an observer present for inspecting the storage vessel prior to refilling.

(ii) If the owner or operator finds that the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, the owner or operator shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the storage vessel with benzene.

(d) Upon reconstruction, an existing storage vessel shall be considered a new storage vessel for purposes of this subpart. If it is in compliance with the requirements of § 61.122(a) for new storage vessels, it is exempt from the requirements of § 61.07.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 61.123 Equivalent equipment and procedures.

(a) Upon written application from any person, the Administrator may approve the use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing benzene emissions to the atmosphere to those prescribed for compliance with § 61.122(a) of this subpart. For an existing source, all requests for using an equivalent method as the inital means of control is to be submitted to the Administrator within 30 days of the effective date of the standard. For a new source, all requests for using an equivalent method is to be submitted to the Administrator with the application for approval of construction or modification required by § 61.07.

(b) Determination of equivalence to the specified equipment required in § 61.122(a) will be evaluated using the following information to be included in the written application to the Administrator:

(1) By an actual emissions test which uses a full-size or scale-model sealed storage vessel that accurately collects and measures all benzene emissions from a given control device, and which accurately simulates wind and accounts for other emission variables such as temperature and barometric pressure. The test facility shall be subject to prior approval by the Administrator. Or,

(2) By an engineering evaluation where the Administrator determines that the evaluation is an accurate method of determining equivalence.

(c) The Administrator may condition approval of equivalency on requirements that may be necessary to ensure operation and maintenace to achieve the same emission reduction as the requirements of § 61.122(a).

(d) If in the Administrator's judgment an application for equivalence may be approvable, the Administrator will publish a notice of preliminary determination in the **Federal Register** and provide the opportunity for public hearing. After notice and opportunity for public hearing, the Administrator will determine the equivalence of the alternative means of emission control and will publish the final determination in the **Federal Register**.

(e) A metallic shoe seal is considered an equivalent control device to the liquid-mounted seal required in § 61.122(a)(2). Rim vents will be set to open when the roof is being floated off the leg supports or at the manufacturer's recommended setting.

(f) The following system will be considered an equivalent system to that described in § 61.122(a), if it is approved by the Administrator:

(1) A vapor recovery system which collects all benzene vapors and gases discharged from the storage vessel, and a vapor return or disposal system which is designed to process such benzene vapors and gases so as to reduce their emission to the atmosphere by at least 95 percent by weight and which is operated at the design specifications to achieve this emission reduction. The efficiency of the vapor control system shall be calculated by comparing the controlled emissions to those emissions which would occur from a like-sized fixed-roof storage vessel without a vapor control system.

(2) In requesting approval for use of the vapor recovery system described in paragraph (f) of this section, the owner or operator shall provide the Administrator with the following information:

(i) Emission data, if available, for a similar vapor recovery and return or disposal system used on the same type of storage vessel, which can be used to determine the efficiency of the system. A complete description of the emission measurement method used must be included.

(ii) The manufacturer's design specifications and estimated emission reduction capability of the system.

(iii) The operation and maintenance plan for the system.

(iv) Any other information which will be useful to the Administrator in evaluating the effectiveness of the system in reducing benzene emissions.

(9) For the purpose of determining equivalence, flares are assumed to reduce benzene emissions to the atmosphere by 60 percent by weight unless demonstrated by emission testing to be more efficient.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 61.124 Initial report.

(a) The owner or operator of each existing storage vessel to which this subpart applies and who does not request a waiver of compliance under § 61.10, shall submit along with the report required by § 61.10 a report describing the existing controls.

(1) Where the existing controls do not meet the requirements of § 61.122(a), the owner or operator shall submit, along with the report required by § 61.10, a report describing the control equipment to be installed to comply with § 61.122(a); and

(2) Notify the Administrator in writing at least 30 days prior to the refilling of each storage vessel that was required to be emptied for installation of controls required by § 61.122(a), so that the Administrator has an opportunity to have an observer present to inspect the storage vessel before it is refilled. If it has not been necessary to completely empty the storage vessel to install controls, the onwer or operator shall submit a written report to the Administrator within 30 days after controls are installed. The report shall state the date controls were installed and shall described all deviations in controls from those described in the report submitted in accordance with paragraph (a)(1) of this section.

(b) The owner or operator who obtains a waiver of compliance under § 61.10, shall:

(1) Notify the Administrator in writing at least 30 days prior to the filling of each storage vessel that was required to be emptied for installation of controls required by § 61.122(a), so that the Administrator has an opportunity to have an observer present to inspect the storage vessel before it is filled. If it has not been necessary to completely empty the storage vessel to install controls, the owner or operator shall submit a report to the Administrator within 30 days after controls are installed. The report shall include the date controls were installed and shall describe all deviations in controls from those described in the report submitted in accordance with §61.10.

(c) The owner or operator of each new storage vessel to which this subpart applies shall submit, along with the report required by § 61.07, a report which describes the control equipment on the storage vessel, and which states the expected date for filling the storage vessel. The report shall be submitted to the Administrator at least 30 days prior to filling the storage vessel so that the Administrator has an opportunity to have an observer present to inspect the storage vessel before it is filled.

(d) The owner or operator of each new storage vessel that existed prior to the effective date of these standards shall submit, along with the report required by § 61.10, a report describing the control equipment installed on the storage vessel. The report shall be submitted within 30 days after the effective date.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

§ 61.125 Periodic reports.

(a) The owner or operator of each storage vessel to which this subpart applies shall submit a report describing the results of each inspection conducted in accordance with § 61.122(c)(2).

(1) The first report is to be submitted 3 months after the initial report submitted in accordance with § 61.124. The first report shall include a reporting schedule stating the months that the quarterly reports will be submitted. Subsequent quarterly reports shall be submitted according to this schedule, unless a revised schedule has been submitted in the previous quarterly report.

(2) Each report shall include the date of the inspection of each storage vessel and identify each storage vessel in which benzene has accumulated on or there are defects in the internal floating roof, the internal floating roof is not resting on and in direct contact with the surface of the benzene liquid inside the storage vessel, there are visible gaps between the secondary seal and the wall of the storage vessel, or there are holes, tears, or other openings in the secondary seal or the seal fabric.

(3) Where a quarterly report identifies any condition in paragraph (a)(2) of this section the subsequent quarterly report shall describe the measures used to correct the condition, the date of storage vessel was emptied, and the date the condition was repaired.

(b) The owner or operator of each storage vessel to which this subpart applies shall submit an interim report if any condition listed in paragraph (a)(2) of this section was identified and the condition was not repaired or the storage vessel was not emptied within 30 days of the date the condition was first identified. This report shall be postmarked no later than 40 days after the date the condition was identified.

(c) The owner or operator of each storage vessel to which this subpart applies shall submit a report describing the results of the inspection conducted in accordance with § 61.122(c)(3).

(1) The first report is to be submitted within the 5-year period after the initial report submitted in accordance with § 61.124, with subsequent reports during each 5-year period therafter.

(2) Each report shall identify each storage vessel in which the owner or operator finds that the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric.

(3) A report shall be submitted 30 days prior to the refilling of each storage vessel describing repairs made, and giving the date of refilling of the vessel so the Administrator has an opportunity to have an observer present to inspect the storage vessel before it is refilled.

(Sec. 114 of the Clean Air Act as amended (42 U.S.C. 7414))

[FR Doc. 80-39484 Filed 12-18-80; 8:45 am]

Federal Register / Vol. 46, No. 19 / Thursday, January 29, 1981 / Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-1740-7]

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Benzene Storage Vessels

AGENCY: Environmental Protection Agency (EPA).

ACTION: Amended notice of public hearing and extension of public comment period.

SUMMARY: The public hearing has been postponed 57 days and the end of the public comment period extended 57 days for the proposed national emission standard for benzene emissions from benzene storage vessels in response to a request from the American Petroleum Institute. This request expressed the need to complete their own exposure modeling, technical and economic analyses, and emission testing in order to evaluate EPA's data base and to provide additional information.

DATES: Written comments to be included in the record on the proposed standard must be postmarked no later than May 8, 1981. Notice of intent to present oral testimony at the public hearing must be postmarked no later than April 1, 1981. The public hearing will be held on April 8, 1981. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than May 8, 1981.

ADDRESSES: Comments on the proposed standard should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-14, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

The public hearing will be held at the EPA Administration Building Auditorium, Research Triangle Park, North Carolina, beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5271.

SUPPLEMENTARY INFORMATION: On December 12, 1980, EPA proposed in the Federal Register (45 FR 83952) a national emission standard for benzene emissions from benzene storage vessels. In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards. This notice amends the date of the public hearing and extends the end of the public comment period.

Dated: January 23, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-3308 Filed 1-28-81; 8:45 am]

Federal Register / Vol. 46, No. 57 / Wednesday, March 25, 1981 / Proposed Rules

40 CFR Part 61

[AD-FRL-1787-5]

National Emission Standards for Hazardous Air Pollutants; Benzene Emissions From Benzene Storage Vessels

AGENCY: Environment Protection Agency (EPA).

ACTION: Amended notice of public hearing and extension of public comment period.

SUMMARY: The public hearing has been postponed 62 days and the end of the public comment period extended 62 days for the proposed national emission standard for benzene emissions from benzene storage vessels in response to a request from the American Petroleum Institute.

DATES: Written comments to be included in the record on the proposed standard must be postmarked no later than July 8, 1981. Notice of intent to present oral testimony at the public hearing must be postmarked no later than June 2, 1981. The public hearing will be held on June 9, 1981. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than July 8, 1981.

ADDRESSES: Comments on the proposed standard should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-14, U.S. Environmental Protection Agency, 401 M Street SW., Washington, D.C. 20460.

The public hearing will be held at the EPA Administration Building Auditorium, Research Triangle Park, North Carolina, beginning at 9:00 a.m.

Persons wishing to present oral testimony should notify Ms. Naomi Durkee, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5571.

FOR FURTHER INFORMATION CONTACT: Susan Wyatt, (919) 541-5580.

SUPPLEMENTARY INFORMATION: On December 12, 1980, EPA proposed in the Federal Register (45 FR 83952) a national emission standard for benzene emissions from benzene storage vessels. In that notice, EPA announced the date ending the public comment period and the date and location of the public hearing to receive public comment on the proposed standards. This notice amends the date of the public hearing and extends the end of the public comment period.

Dated: March 19, 1981.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-9105 Filed 3-24-81; 8:45 am]

Federal Register / Vol. 46, No. 121 / Wednesday, June 24, 1981 / Proposed Rules

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL-1861-4]

National Emission Standards for Hazardous Air Pollutants; Benzene Fugitive Emissions; Benzene Emissions from Benzene Storage Vessels

AGENCY: Environmental Protection Agency (EPA).

ACTION: Extensions of public comment periods.

SUMMARY: The end of the public comment period has been extended 30 days for the proposed national emission standard for benzene fugitive emissions and the proposed national emission standard for benzene emissions from benzene storage vessels. 45 FR 83952, December 19, 1980, 46 FR 18561, March 25, 1981.

DATES: Written comments to be included in the record on the proposed standards must be postmarked no later than September 14, 1981, for the proposed national emission standard for benzene fugitive emissions and August 10, 1981, for the proposed national emission standard for benzene emissions from benzene storage vessels. Written comments responding to, supplementing, or rebutting written or oral comments received at the public hearing must be postmarked no later than September 14, 1981, and August 10, 1981, for the proposed benzene fugitive and benzene storage emission standards, respectively.

ADDRESSES: Comments on the proposed standard for bezene fugitive emissions should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-79-27, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

Comments on the proposed standard for benzene emissions from benzene storage vessels should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket Number A-80-14, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Ms. Susan Wyatt, Emission Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, (919) 541-5578.

SUPPLEMENTARY INFORMATION: EPA received a request to extend the public comment periods for the two proposed standards because the public hearing for the proposed benzene fugitive emissions standard was close to the end of the comment period for the proposed benzene storage vessels standard. The comment periods for the proposed standards were extended, therefore, in order to provide an opportunity for more meaningful public participation in the proposed rulemaking.

Dated: June 16, 1981.

Edward F. Tuerk,

Acting Assistant Administrator.

[FR Doc. 81-18823 Filed 6-23-81; 8:45 am]

ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

TEST METHODS

APPENDIX B

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AP-FRL 1563-1]

National Emission Standards for Hazardous Air Pollutants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule.

SUMMARY: On June 7, 1977 (42 FR 29005) the Administrator promulgated amendments to the national emission standards for the hazardous air pollutant vinyl chloride. The Administrator also promulgated amendments to Appendix B—Test Methods, of this part. Since the promulgation of Method 106—Determination of Vinyl Chloride from Stationary Sources and Method 107, Determination of Vinyl Chloride Content of Inprocess Wastewater Samples and Vinyl Chloride Content of Polyvinyl Chloride Resin, Slurry, Wet Cake, and Latex Samples, several improvements in the methods have been developed. These revisions incorporate those improvements.

DATES: Comments must be received by January 19, 1981.

ADDRESSES: Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket No. A-80-50, U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, D.C. 20460.

FOR FURTHER INFORMATION CONTACT: Roger Shigehara, Emission Measurement Branch (MD-19), U.S. Environmental Protection Agency, Research Triangle Park, N.C. 27711; telephone number (919) 541-2237.

SUPPLEMENTARY INFORMATION: These revised procedures differ from the previous methods as follows: Method 106—(1) sample bag size can range from 50 to 100 liters rather than the single size bag previously required, and (2) analysis audit and chromatograph with resolution quality assurance requirements are added. These requirements are contained in Appendix C, 40 CFR Part 61, as proposed with the National Emission Standard for Benzene Emissions from Maleic Anhydride Plants (45 FR 26660). Method 107—(1) a head space vial pre-pressurizer is added to obtain correct head space gas equilibrium, (2) different chromatograph columns are suggested for analysis, and (3) chromatorgraph resolution quality assurance requirements are added.

The Administrator finds that notice and public procedure is unnecessary because the revisions are minor and technical. These revisions are issued under the authority of Section 114 of the Clean Air Act as amended (42 U.S.C. 7414)

Dated: November 10, 1980

Douglas Costle,

Administrator

40 CFR Part 61 is amended by revising Test Methods 106 and 107 of Appendix B to read as follows:

Appendix B—Test Methods

* * * * *

Method 106—Determination of Vinyl Chloride From Stationary Sources

Introduction [1]

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, because knowledge beyond the scope of this presentation is required. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. *Applicability and Principle.*

1.1 Applicability. The method is applicable to the measurement of vinyl chloride in stack gases from ethylene dichloride, vinyl chloride, and polyvinyl chloride manufacturing processes. The method does not measure vinyl chloride contained in particulate matter.

1.2 Principle. An integrated bag sample of stack gas containing vinyl chloride (chloroethene) is subjected to gas chromatographic (GC) analysis using a flame ionization detector (FID).

2. *Range and Sensitivity.*

This method is designed for the 0.1 to 50 ppm range. However, common GC instruments are capable of detecting 0.02 ppm vinyl chloride. With proper calibration, the upper limit may be extended as needed.

3. *Interferences.*

The chromatographic columns and the corresponding operating parameters herein described normally provide an adequate resolution of vinyl chloride; however, resolution interferences may be encountered on some sources. Therefore, the chromatograph operator shall select the column and operating parameters best suited to his particular analysis requirements, subject to the approval of the Administrator. Approval is automatic, provided that the tester produces confirming data through an adequate supplemental analytical technique, such as analysis with a different column or GC/mass spectroscopy, and has the data available for review by the Administrator.

4. *Apparatus.*

4.1 Sampling (see Figure 106-1). The sampling train consists of the following components:

4.1.1 Probe. Stainless steel, Pyrex glass, or Teflon tubing (as stack temperature permits) equipped with a glass wool plug to remove particulate matter.

4.1.2 Sample Lines. Teflon, 6.4-mm outside diameter, of sufficient length to connect probe to bag. Use a new unused piece for each series of bag samples that constitutes an emission test, and discard upon completion of the test.

4.1.3 Quick Connects. Stainless steel, male (2) and female (2), with ball checks (one pair without), located as shown in Figure 106-1.

4.1.4 Tedlar Bags. 50- to 100-liter capacity, to contain sample. Aluminized Mylar bags may be used if the samples are analyzed within 24 hours of collection.

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[1] Mention of any trade or specific product does not constitute endorsement by the U.S. Environmental Protection Agency.

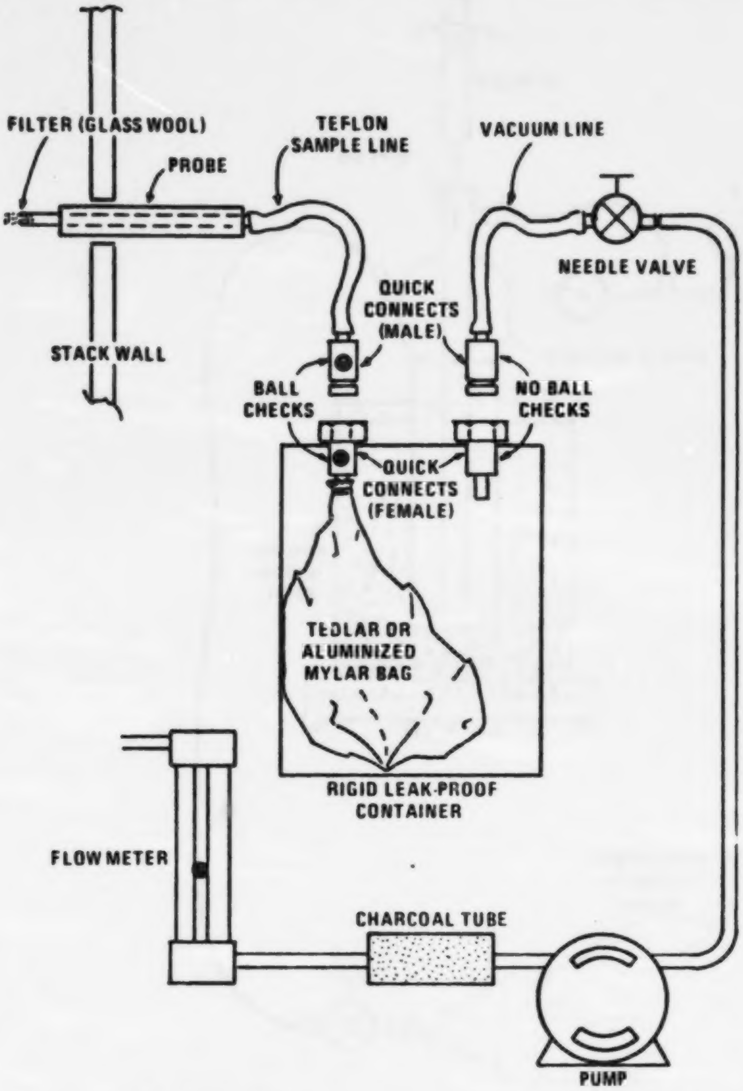
FILTER (GLASS WOOL)
PROBE
TEFLON SAMPLE LINE
VACUUM LINE
NEEDLE VALVE
STACK WALL
QUICK CONNECTS (MALE)
BALL CHECKS
NO BALL CHECKS
QUICK CONNECTS (FEMALE)
TEDLAR OR ALUMINIZED MYLAR BAG
RIGID LEAK-PROOF CONTAINER
FLOW METER
CHARCOAL TUBE
PUMP

Figure 106-1. Integrated-bag sampling train. (Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.)

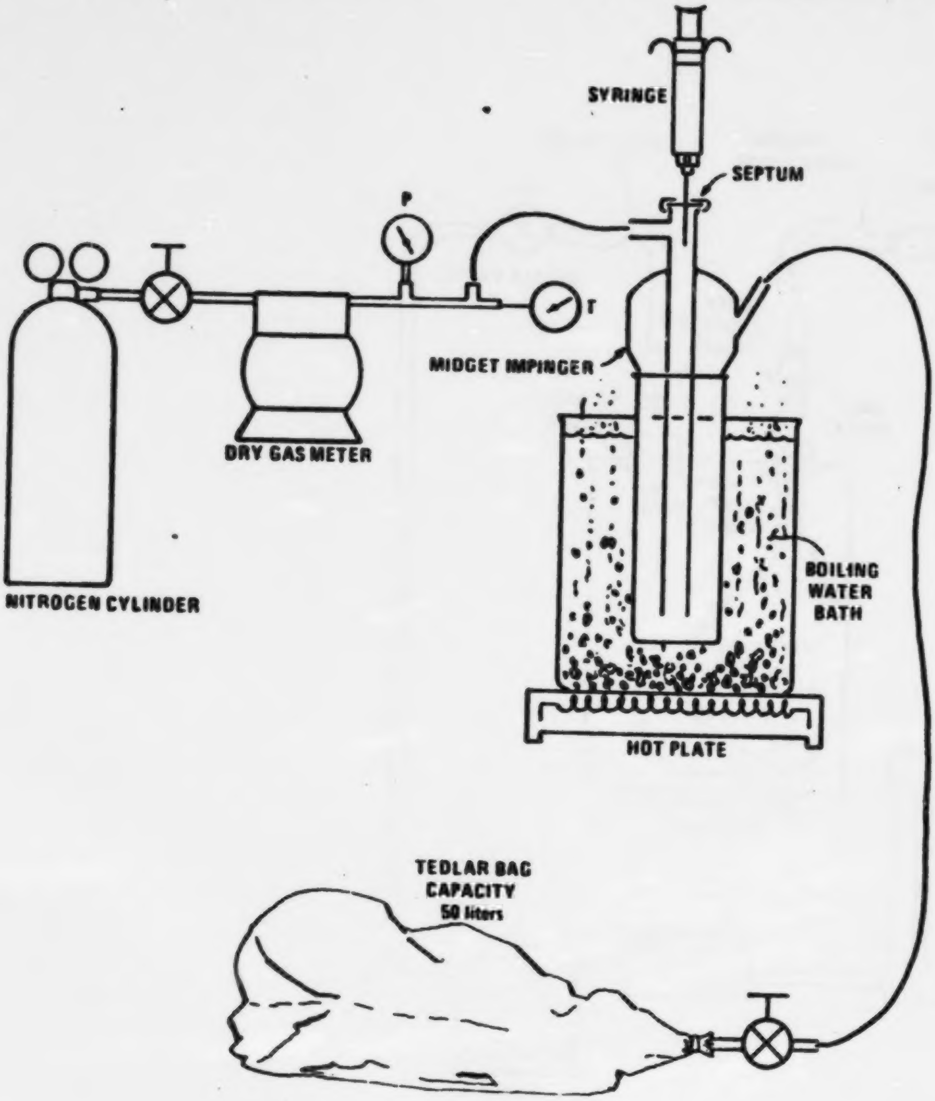
SYRINGE
SEPTUM
P
T
MIDGET IMPINGER
DRY GAS METER
NITROGEN CYLINDER
BOILING WATER BATH
HOT PLATE
TEDLAR BAG CAPACITY 50 liters

Figure 106-2. Preparation of standards (optional).

4.1.5 Bag Containers. Rigid leakproof containers for sample bags, with covering to protect contents from sunlight.

4.1.6 Needle Valve. To adjust sample flow rates.

4.1.7 Pump. Leak-free, with minimum of 2-liter/min capacity.

4.1.8 Charcoal Tube. To prevent admission of vinyl chloride, and other organics to the atmosphere in the vicinity of samplers.

4.1.9 Flow Meter. For observing sampling flow rate; capable of measuring a flow range from 0.10 to 1.00 liter/min.

4.1.10 Connecting Tubing. Teflon, 6.4-mm outside diameter, to assemble sampling train (Figure 106-1).

4.2 Sample Recovery. Teflon tubing, 6.4-mm outside diameter, to connect bag to gas chromatograph sample loop for sample recovery. Use a new unused piece for each series of bag samples that constitutes an emission test, and discard upon conclusion of analysis of those bags.

4.3 Analysis. The following equipment is required:

4.3.1 Gas Chromatograph. With FID, potentiometric strip chart recorder and 1.0- to 5.0-ml heated sampling loop in automatic sample valve. The chromatographic system shall be capable of producing a response to 0.1-ppm vinyl chloride that is at least as great as the average noise level. (Response is measured from the average value of the base line to the maximum of the waveform, while standard operating conditions are in use.)

4.3.2 Chromatographic Columns. Columns as listed below. The analyst may use other columns provided that the precision and accuracy of the analysis of vinyl chloride standards are not impaired and he has available for review information confirming that there is adequate resolution of the vinyl chloride peak. (Adequate resolution is defined as an area overlap of not more than 10 percent of the vinyl chloride peak by an interferent peak. Calculation of area overlap is explained in Appendix C, Supplement A: "Determination of Adequate Chromatographic Peak Resolution.")

4.3.2.1 Column A. Stainless steel, 2.0 m by 3.2 mm, containing 80/100-mesh Chromasorb 102.

4.3.2.2 Column B. Stainless steel, 2.0 m by 3.2 mm, containing 20 percent GE SF-96 on 60/80-mesh Chromasorb P AW; or stainless steel, 1.0 m by 3.2 mm containing 80/100-mesh Porapak T. Column B is required as a secondary column if acetaldehyde is present. If used, column B is placed after column A. The combined columns should be operated at 120°C.

4.3.3 Flow Meters (2). Rotameter type, 100-ml/min capacity, with flow control valves.

4.3.4 Gas Regulators. For required gas cylinders.

4.3.5 Thermometer. Accurate to 1°C, to measure temperature of heated sample loop at time of sample injection.

4.3.6 Barometer. Accurate to 5 mm Hg, to measure atmospheric pressure around gas chromatograph during sample analysis.

4.3.7 Pump. Leak-free, with minimum of 100-ml/min capacity.

4.3.8 Recorder. Strip chart type, optionally equipped with either disc or electronic integrator.

4.3.9 Planimeter. Optional, in place of disc or electronic integrator on recorder, to measure chromatograph peak areas.

4.4 Calibration. Sections 4.4.2 through 4.4.4 are for the optional procedure in Section 7.1.

4.4.1 Tubing. Teflon, 6.4-mm outside diameter, separate pieces marked for each calibration concentration.

4.4.2 Tedlar Bags. Sixteen-inch-square size, with valve; separate bag marked for each calibration concentration.

4.4.3 Syringes. 0.5-ml and 50-μl, gas tight, individually calibrated to dispense gaseous vinyl chloride.

4.4.4 Dry Gas Meter, With Temperature and Pressure Gauges. Singer model DTM-115 with 802 index, or equivalent, to meter nitrogen in preparation of standard gas mixtures, calibrated at the flowrate used to prepare standards.

5. *Reagents.*

Use only reagents that are of chromatograph grade.

5.1 Analysis. The following are required for analysis.

5.1.1 Helium or Nitrogen. Zero grade, for chromatographic carrier gas.

5.1.2 Hydrogen. Zero grade.

5.1.3 Oxygen or Air. Zero grade, as required by the detector.

5.2 Calibration. Use one of the following options: either 5.2.1 and 5.2.2, or 5.2.3.

5.2.1 Vinyl Chloride. Pure vinyl chloride gas certified by the manufacturer to contain a mimimum of 99.9 percent vinyl chloride, for use in the preparation of standard gas mixtures in Section 7.1. If the gas manufacturer maintains a bulk cylinder supply of 99.9+ percent vinyl chloride, the certification analysis may have been performed on this supply rather than on each gas cylinder prepared from this bulk supply. The date of gas cylinder preparation and the certified analysis must have been affixed to the cylinder before shipment from the gas manufacturer to the buyer.

5.2.2 Nitrogen. Zero grade, for preparation of standard gas mixtures as described in Section 7.1.

5.2.3 Cylinder Standards (3). Gas mixture standards (50-, 10-, and 5-ppm vinyl chloride in nitrogen cylinders). The tester may use cylinder standards to directly prepare a chromatograph calibration curve as described in Section 7.2.2, if the following conditions are met: (a) The manufacturer certifies the gas composition with an accuracy of ± 3 percent or better (see Section 5.2.3.1); (b) The manufacturer recommends a maximum shelf life over which the gas concentration does not change by greater than ± 5 percent from the certified value; (c) The manufacturer affixes the date of gas cylinder preparation, certified vinyl chloride concentration, and recommended maximum shelf life to the cylinder before shipment to the buyer.

5.2.3.1 Cylinder Standards Certification. The manufacturer shall certify the concentration of vinyl chloride in nitrogen in each cylinder by (a) directly analyzing each cylinder and (b) calibrating his analytical procedure on the day of cylinder analysis. To calibrate his analytical procedure, the manufacturer shall use, as a minimum, a three-point calibration curve. It is recommended that the manufacturer maintain (1) a high-concentration calibration standard (between 50 and 100 ppm) to prepare his calibration curve by an appropriate dilution technique and (2) a low-concentration calibration standard (between 5 and 10 ppm) to verify the dilution technique use. If the difference between the apparent concentration read from the calibration curve and the true concentration assigned to the low-concentration calibration standard exceeds 5 percent of the true concentration, the manufacturer shall determine the source of error and correct it, then repeat the three-point calibration.

5.2.3.2 Verification of Manufacturer's Calibration Standards. Before using a standard, the manufacturer shall verify each calibration standard (a) by comparing it to gas mixtures prepared (with 99 Mol precent vinyl chloride) in accordance with the procedure described in Section 7.1 or (b) by having it analyzed by the National Bureau of Standards. The agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent. The manufacturer must reverify all calibration standards on a time interval consistent with the shelf life of the cylinder standards sold.

5.2.4 Audit Cylinder Standards (2). Gas mixture standards with concentrations known only to the person supervising the analysis of samples. The audit cylinder standards shall be identically prepared as those in Section 5.2.3 (Vinyl chloride in nitrogen cylinders). The concentrations of the audit cylinders should be: one low-concentration cylinder in the range of 5 of 20 ppm vinyl chloride, and one high-concentration cylinder in the range of 20 to 50 ppm. When available, the tester may obtain audit cylinders by contacting: Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Quality Assurance Division (MD-77), Research Triangle Park, North Carolina 27711. If audit cylinders are not available at the Enviromental Protection Agency, the tester must secure an alternative source.

6. *Procedure.*

6.1 Sampling. Assemble the sample train as shown in Figure 106-1. Perform a bag leak check according to Section 7.3.2. join the quick connects as illustrated, and determine that all connections between the bag and the probe are tight. Place the end of the probe at the centroid of the stack and start the pump with the needle value adjusted to yield of flow that will fill over 50 percent of bag volume in the specified sample period. After allowing sufficient time to purge the line several times, connect the vacuum line to the bag and evacuate the bag until the rotameter indicates no flow. Then reposition the sample and vacuum lines and begin the actual sampling, keeping the rate proprotional to the stack velocity. At all times, direct the gas exiting the rotameter away from sampling personnel. At the end of the sample period, shut off the pump, disconnect the sample line from the bag, and disconnect the vaccuum line from the bag container. Protect the bag container from sunlight.

6.2 Sample Storage. Keep the sample bags out of direct sunlight. When at all possible, analysis is to be performed within 24 hours, but in no case in excess of 72 hours of sample collection. Aluminized Mylar bag samples must be analyzed within 24 hours.

6.3 Sample Recovery. With a new piece of Teflon tubing identified for that bag, connect a bag inlet valve to the gas chromatograph sample valve. Switch the valve to receive gas from the bag through the sample loop. Arrange the equipment so the sample gas passes from the sample value to 100-ml/min rotameter with flow control valve followed by a charcoal tube and a 1-in. H_2O pressure gauge. The tester may maintain the sample flow either by a vacuum pump or container pressurization if the collection bag remains in the rigid container. After sample loop purging is ceased, allow the pressure gauge to return to zero before activating the gas sampling valve.

6.4 Analysis. Set the column temperature to 100°C and the detector temperature to 150°C. When optimum hydrogen and oxygen flow rates have been determined, verify and maintain these flow rates during all chromatograph operations. Using zero helium or nitrogen as the carrier gas, establish a flow rate in the range consistent with the manufacturer's requirements for satisfactory detector operation. A flow rate of approximately 40 ml/min should produce adequate separations. Observe the base line periodically and determine that the noise level has stabilized and that base-line drift has ceased. Purge the sample loop for 30 seconds at the rate of 100 ml/min, then activate the sample valve. Record the injection time (the position of the pen on the chart at the time of sample injection), sample number, sample loop temperature, column temperature, carrier gas flow rate, chart speed, and attenuator setting. Record the barometric pressure. From the chart, note the peak having the retention time corresponding to vinyl chloride, as determined in Section 7.2.1. Measure the vinyl chloride peak area, A_m, by use of a disc integrator, electronic integrator, or a planimeter. Measure and record the peak height, H, H_m. Record A_m and the retention time. Repeat the injection at least two times or until two consecutive values for the total area of the vinyl chloride peak do not vary more than 5 percent. Use the average value for these two total areas to compute the bag concentration.

Compare the ratio of H_m to A_m for the vinyl chloride sample with the same ratio for the standard peak that is closest in height. If these ratios differ by more than 10 percent, the vinyl chloride peak may not be pure (possibly acetaldehyde is present) and the secondary column should be employed (see Section 4.3.2.2).

6.5 Determination of Bag Water Vapor Content. Measure the ambient temperature and barometric pressure near the bag. From a water saturation vapor pressure table, determine and record the water vapor content of the bag as decimal figure. (Assume the relative humidity to be 100 percent unless a less value is known.)*

7. *Preparation of Standard Gas Mixtures, Calibration, and Quality Assurance.*

7.1 Preparation of Vinyl Chloride Standard Gas Mixtures. (Optional Procedure—delete if cylinder standards are used.) Assemble the apparatus shown in Figure 106-2. Evacuate a 16-inch-square Tedlar bag that has passed a leak check (described in Section 7.3.2) and meter in 5.0 liters of nitrogen. While the bag is filling, use the 0.5-ml syringe to inject 250 μl of 99.9+ percent vinyl chloride gas through the wall of the bag. Upon withdrawing the syringe, immediately cover the resulting hold with a piece of adhesive tape. The bag now contains a vinyl chloride concentration of 50 ppm. In a like manner use the 50 μl syringe to prepare gas mixtures having 10- and 5-ppm vinyl chloride concentrations. Place each bag on a smooth surface and alternately depress opposite sides of the bag 50 times to further mix the gases. These gas mixture standards may be used for 10 days from the date of preparation, after which time new gas mixtures must be prepared. (Caution: Contamination may be a problem when a bag is reused if the new gas mixture standard is a lower concentration than the previous gas mixture standard.)

7.2 Calibration.

7.2.1 Determination of Vinyl Chloride Retention Time. (This section can be performed simultaneously with Section 7.2.2.) Establish chromatograph conditions identical with those in Section 6.4 above. Determine proper attenuator position. Flush the sampling loop with zero helium or nitrogen and activate the sample valve. Record the injection time, sample loop temperature, column temperature, carrier gas flow rate, chart speed, and attenuator setting. Record peaks and detector responses that occur in the absence of vinyl chloride. Maintain conditions with the equipment plumbing arranged identically to Section 6.3, and flush the sample loop for 30 seconds at the rate of 100 ml/min with one of the vinyl chloride calibration mixtures. Then activate the sample valve. Record the injection time. Select the peak that corresponds to vinyl chloride. Measure the distance on the chart from the injection time to the time at which the peak maximum occurs. This quantity divided by the chart speed is defined as the retention time. Since other organics may be present in the sample, positive identification of the vinyl chloride peak must be made.

7.2.2 Preparation of Chromatograph Calibration Curve. Make a gas chromatographic measurement of each gas mixture standard (described in Section 5.2.3 or 7.1) using conditions identical with those listed in Sections 6.3

and 6.4. Flush the sampling loop for 30 seconds at the rate of 100 ml/min with one of the standard mixtures, and activate the sample valve. Record the concentration of vinyl chloride injected (C_c), attenuator setting, chart speed, peak area, sample loop temperature, column temperature, carrier gas flow rate, and retention time. Record the barometric pressure. Calculate A_c, the peak area multiplied by the attenuator setting. Repeat until two consecutive injection areas are within 5 percent, then plot the average of those two values versus C_c. When the other standard gas mixtures have been similarly analyzed and plotted, draw a straight line through the points derived by the least squares method. Perform calibration daily, or before and after each set of bag samples, whichever is more frequent.

7.3 Quality Assurance.

7.3. Analysis Audit. Immediately after the preparation of the calibration curve and prior to the sample analyses, perform the analysis audit described in Appendix C, Supplement B: "Procedure for Field Auditing GC Analysis."

7.3.2 Bag Leak Checks. Checking of bags for leaks is required after bag use and strongly recommended before bag use. After each use, connect a water manometer and pressurize the bag to 5–10 cm H_2O (2–4 in H_2O). Allow to stand for 10 min. Any displacement in the water manometer indicates a leak. Also, check the rigid container for leaks in this manner.

Note.—An alternative leak check method is to pressurize the bag to 5–10 cm H_2O or 2–4 in. H_2O and allow it to stand overnight. A deflated bag indicates a leak.

For each sample bag in its rigid container, place a rotameter in-line between the bag and the pump inlet. Evacuate the bag. Failure of the rotameter to register zero flow when the bag appears to be empty indicates a leak.

8. *Calculations.*

8.1 Determine the sample peak area, A_c, as follows:

$$A_c = A_m A_f$$

Where:

A_m = Measured peak area.
A_f = Attenuation factor.

8.2 Vinyl Chloride Concentrations. From the calibration curve described in Section 7.2.2, select the value of, C_c, that corresponds to A_c, the sample peak area. Calculate the concentration of vinyl chloride in the bag, C_b, as follows:

$$C_b = \frac{C_c P_r T_i}{P_i T_r (1 - B_{wb})} \qquad \text{Eq. 106-2}$$

Where:

P_r = Reference pressure, the laboratory pressure recorded during calibration, mm Hg.
T_i = Sample loop temperature on the absolute escale at the time of analysis, °K.
P_i = Laboratory pressure at time of analysis, mm Hg.
T_r = Reference temperature, the sample loop temperature recorded during calibration, °K.
B_{wb} = Volume fraction of water vapor content of the bag sample, as analyzed.

9. *References.*

1. Brown, D.W., E.W. Loy, and M.H. Stephenson. Vinyl Chloride Monitoring Near the B. F. Goodrich Chemical Company in Louisville, Kentucky. Region IV, U.S. Environmental Protection Agency, Surveillance and Analysis Division, Athens, GA. June 24, 1974.

2. G.D. Clayton and Associates. Evaluation of a Collection and Analytical Procedure for Vinyl Chloride in Air. EPA Contract No. 68–02–1408, Task Order No. 2, EPA Report No. 75–VCL–1. December 13, 1974.

3. Midwest Research Institute. Standardization of Stationary Source Emission Method for Vinyl Chloride. EPA–600/4–77–026. May 1977.

4. Scheil, W. and M.C. Sharp. Collaborative Testing of EPA Method 106 (Vinyl Chloride) that will provide for a Standardized Stationary Source Emission Measurement Method. EPA 600/4–78–058. Emission Monitoring and Support Laboratory. Research Triangle Park, NC. October 1978.

Method 107—Determination of Vinyl Chloride Content of Inprocess Wastewater Samples, and Vinyl Chloride Content of Polyvinyl Chloride Resin, Slurry, Wet Cake, and Latex Samples

Introduction [1]

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph, nor by those who are unfamiliar with source sampling, because knowledge beyond the scope of this presentation is required. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. *Applicability and Principle.*

1.1 Applicability. This method applies to the measurement of the vinyl chloride monomer (VCM) content of inprocess wastewater samples, and the residual vinyl chloride monomer (RVCM) content of polyvinyl chloride (PVC) resins, wet cake, slurry, and latex samples. It cannot be used for polymer in fused forms, such as sheet or cubes. This method is not acceptable where methods from Section 304(h) of the Clean Water Act, 33 U.S.C. 1251 et seq. (the Federal Water Pollution Control Amendments of 1972 as amended by the Clean Water Act of 1977) are required.

1.2 Principle. The basis for this method relates to the vapor equilibrium that is established between RVCM, PVC resin, water, and air in a closed system. The RVCM in a PVC resin will equilibrate rapidly in a closed vessel, provided that the temperature of the PVC resin is maintained above the glass transition temperature of that specific resin.

2. *Range and Sensitivity.*

The lower limit of detection of vinyl chloride will vary according to the chromatography used. Values reported include 1×10^{-7} mg and 4×10^{-7} mg. With proper calibration, the upper limit may be extended as needed.

3. *Interferences.*

The chromatograph columns and the corresponding operating parameters herein described normally provide an adequate resolution of vinyl chloride; however, resolution interferences may be encountered on some sources. Therefore, the chromatograph operator shall select the column and operating parameters best suited to his particular analysis requirements, subject to the approval of the Administrator. Approval is automatic provided that the tester produces confirming data through an adequate supplemental analytical technique, such as analysis with a different column or GC/mass spectroscopy, and has the data available for review by the Administrator.

4. *Precision and Reproducibility.*

An interlaboratory comparison between seven laboratories of three resin samples, each split into three parts, yielded a standard deviation of 2.63 percent for a sample with a mean of 2.09 ppm, 4.16 percent for a sample with a mean of 1.66 ppm, and 5.29 percent for a sample with a mean of 62.66 ppm.

5. *Safety.*

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with VCM/air mixtures must be held to a minimum. When they are required, the vapor must be routed to outside air. Vinyl Chloride, even at low ppm levels, must never be vented inside the laboratory. After vials have been analyzed, the gas must be vented prior to removal of the vial from the instrument turntable. Vials must be vented through a hypodermic needle connected to an activated charcoal tube to prevent release of vinyl chloride into the laboratory atmosphere. The charcoal must be replaced prior to vinyl chloride breakthrough.

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[1] Mention of trade names or specific products does not constitute endorsement by the U.S. Environmental Protection Agency.

6. *Apparatus.*

6.1 Sampling. The following equipment is required:

6.1.1 Glass Bottles. 60-ml (2-oz) capacity, with wax-lined screw on tops, for PVC samples.

6.1.2 Glass Vials. 50-ml capacity Hypo-vials, sealed with Teflon faced Tuf-Bond discs, for water samples.

6.1.3 Adhesive Tape. To prevent loosening of bottle tops.

6.2 Sample Recovery. The following equipment is required:

6.2.1 Glass Vials. With seals and caps, Perkin-Elmer Corporation No. 105–0118, or equivalent. The seals must be made from butyl rubber. Silicone rubber seals are not acceptable.

6.2.2 Analytical Balance. Capable of weighing to ± 0.0001 gram.

6.2.3 Vial Sealer. Perkin-Elmer No. 105.0106 or equivalent.

6.3 Analysis. The following equipment is required:

6.3.1 Gas Chromatograph. Perkin-Elmer Corporation Model F–40, F–42, or F–45 Head-Space Analyzer, or equivalent. Equipped with backflush accessory.

6.3.2 Chromatograhic Columns. Stainless steel 1 m by 3.2 mm and 2 m by 3.2 mm, both containing 50/80-mesh Porapak Q. The analyst may use other columns provided that the precision and accuracy of the analysis of vinyl chloride standards are not impaired and he has available for review information confirming that there is adequate resolution of the vinyl chloride peak. (Adequate resolution is defined as an area overlap of not more than 10 percent of the vinyl chloride peak by an interferent peak. Calculation of area overlap is explained in Appendix C, Supplement A: "Determination of Adequate Chromatographic Peak Resolution.") Two 1.83 m columns, each containing 1 percent Carbowax 1500 on Carbopak B, have been suggested for samples containing acetaldehyde.

6.3.3 Thermometer. 0 to 100°C, accurate to ± 0.1°C, Perkin-Elmer No. 105–0109, or equivalent.

6.3.4 Sample Tray Thermostat System. Perkin-Elmer No. 105.0103, or equivalent.

6.3.5 Septa. Sandwich type, for automatic dosing, 13 mm, Perkin-Elmer No. 105–1008, or equivalent.

6.3.6 Intergrator-Recorder. Hewlett-Packard Model 33080A, or equivalent.

6.3.7 Filter Drier Assembly (3). Perking-Elmer No. 2230117, or equivalent.

6.3.8 Soap Film Flowmeter. Hewlett Packard No. 0101–0113, or equivalent.

6.3.9 Reguators. For required gas cylinders.

6.3.10 Headspace Vial Pre-Pressurizer. Nitrogen pressurized hypodermic needle inside protective shield. (Blueprint available from Test Support Section, Emission Measurement Branch, Office of Air Quality Planning and Standards, Environmental Protection Agency, Mail Drop 19, Research Triangle Park, N.C. 27711.)

7. *Reagents.*

Use only reagents that are of chromatograph grade.

7.1 Analysis. The following items are required for analysis:

7.1.1 Hydrogen. Zero grade.

7.1.2 Nitrogen. Zero grade.

7.1.3 Air. Zero grade.

7.2 Calibration. The following items are required for calibration:

7.2.1 Cylinder Standards (4). Gas mixture standards (50-, 500-, 2000- and 4000-ppm vinyl chloride in nitrogen cylinders). The tester may use cylinder standards to directly prepare a chromatograph calibration curve as described in Section 9.2, if the following conditions are met: (a) The manufacturer certifies the gas composition with an accuracy of ±3 percent or better (see Section 7.2.1.1). (b) The manufacturer recommends a maximum shelf life over which the gas concentration does not change by greater than ±5 percent from the certified value. (c) The manufacturer affixes the date of gas cylinder preparation, certified vinyl chloride concentration, and recommended maximum shelf life to the cylinder before shipment to the buyer.

7.2.1.1 Cylinder Standards Certification. The manufacturer shall certify the concentration of vinyl chloride in nitrogen in each cylinder by (a) directly analyzing each cylinder and (b) calibrating his analytical procedure on the day of cylinder analysis. To calibrate his analytical procedure, the manufacturer shall use, as a minimum, a three-point calibration curve. It is recommended that the manufacturer maintain (1) a high-concentration calibration standard (between 4000 and 8000 ppm) to prepare his calibration curve by an appropriate dilution technique and (2) a low-concentration calibration standard (between 50 and 500 ppm) to verify the dilution technique used. If the difference between the apparent concentration read from the calibration curve and the true concentration assigned to the low-concentration calibration standard exceeds 5 percent of the true concentration, the manufacturer shall determine the source of error and correct it, then repeat the three-point calibration.

7.2.1.2 Verification of Manufacturer's Calibration Standards. Before using, the manufacturer shall verify each calibration standard by (a) comparing it to gas mixtures prepared (with 99 Mol percent vinyl chloride) in accordance with the procedure described in Section 7.1 of Method 106 or by (b) having it analyzed by the National Bureau of Standards. The agreement between the initially determined concentration value and the verification concentration value must be within ±5 percent. The manufacturer must reverify all calibration standards on a time interval consistent with the shelf life of the cylinder standards sold.

8. *Procedure.*

8.1 Sampling.

8.1.1 PVC Sampling. Allow the resin or slurry to flow from a tap on the tank or silo until the tap line has been well purged. Extend and fill a 60-ml-sample bottle under the tap, and immediately tighten a cap on the bottle. Wrap adhesive tape around the cap and bottle to prevent the cap from loosening. Place an identifying label on each bottle, and record the date, time, and sample location both on the bottles and in a log book.

8.1.2 Water Sampling. Prior to use, the 50-ml vials (without the discs) must be capped with aluminum foil and muffled at 400° C for at last 1 hour to destroy or remove any organic matter that could interfere with analysis. At the sampling location fill the vials bubble-free to overflowing so that a convex meniscus forms at the top. The excess water is displaced as the sealing disc is carefully placed, with the Teflon side down, on the opening of the vial.

Place the aluminum seal over the disc and the neck of the vial, and crimp into place. Affix an identifying label on the bottle, and record the date, time, and sample location both on the vials and in a log book. All samples must be kept refrigerated until analyzed.

8.2 Sample Recovery. Samples must be run within 24 hours.

8.2.1 Resin Samples. The weight of the resin used must be between 3.5 and 4.5 grams. An exact weight must be obtained (±0.0001 g) for each sample. In the case of suspension resins, a volumetric cup can be prepared for holding the required amount of sample. When the cup is used, open the sample bottle, and add the cup volume of resin to the tared sample vial (tared, including septum and aluminum cap). Obtain the exact sample weight, add two drops of distilled water, and immediately seal the vial. Report this value on the data sheet; it is required for calculation of RVCM. In the case of dispersion resins, the cup cannot be used. Weigh the sample in an aluminum dish, transfer the sample to the tared vial, and accurately weigh it in the vial. After pre-pressurization of the samples, condition them for a minimum of 1 hour in the 90° C bath. Do not exceed 5 hours.

Note.—Some aluminum vial caps have a center section that must be removed prior to placing into sample tray. If the cap is not removed, the injection needle will be damaged.

8.2.2 Suspension Resin Slurry and Wet Cake Samples. Decant the water from a wet cake sample, and turn the sample bottle upside down onto a paper towel. Wait for the water to drain, place approximately 0.2 to 4.0 grams of the wet cake sample in a tared vial (tared, including setum and aluminum cap) and seal immediately. Then determine the sample weight (±0.0001 g). All samples must be pre-pressurized and then conditioned for 1 hour at 90° C. A sample of wet cake is used to determine TS (total solids). This is required for calculating the RVCM.

8.2.3 Dispersion Resin Slurry and Geon Latex Samples. The materials should not be filtered. Sample must be thoroughly mixed. Using a tared vial (tared, including septum and alumimum cap) add approximately 8 drops (0.25 to 0.35 g) of slurry or latex using a medicine dropper. This should be done immediately after mixing. Seal the vial as soon as possible. Determine sample weight (±0.0001 g). After pre-pressurization, condition the vial for 1 hour at 90°C in the analyzer bath. Determine the TS on the slurry sample (Section 8.3.5.).

8.2.4 Inprocess Wastewater Samples. Using a tared vial (tared, including septum and aluminum cap) quickly add approximately 1 cc of water using a medicine dropper. Seal the vial as soon as possible. Determine sample weight (±0.0001 g). Pre-pressurize the vial, and then condition for 2 hours at 90°C in the analyzer bath.

8.3 Analysis

8.3.1 Preparation of Equipment. Install the chromatographic column and condition overnight at 160°C. In the first operation, Porapak columns must be purged for 1 hour at 230°C. Do not connect the exit end of the column to the detector while conditioning. Hydrogen and air to the detector must be turned off while the column is disconnected.

8.3.1.1 Flow Rate Adjustments. Adjust flow rates as follows:

a. Nitrogen Carrier Gas. Set regulator on cylinder to read 50 psig. Set regulator on chromatograph to produce a flow rate of 30.0 cc/min. Accurately measures the flow rate at the exit end of the column using the soap film flowmeter and a stopwatch, with the oven and column at the analysis temperature. After the instrument program advances to the "B" (backflush) mode, adjust the nitrogen pressure regulator to exactly balance the nitrogen flow rate at the detector as was obtained in the "A" mode.

b. Vial Pre-Pressurizer Nitrogen. After the nitrogen carrier is set, solve the following equation and adjust the pressure on the vial pre-pressurizer accordingly.

$$P = \frac{T_1}{T_2}\left[P_1 - \frac{P_{w1} - P_{w2}}{7.50}\right] - 10 \text{ k Pa}$$

Where:

T_1 = Ambient temperature, °K.

T_2 = Conditioning bath temperature, °K.

P_1 = Gas chromatograph absolute dosing pressure (analysis mode), k Pa.

P_{w1} = Water vapor pressure @ 90°C (525.8 mm Hg).

P_{w2} = Water vapor pressure @ 22°C (19.8 mm Hg).

7.50 = mm Hg per k Pa.

10 k Pa = Factor to adjust the pre-pressurized pressure to slightly less than the dosing pressure.

Because of gauge errors, the apparatus may over-pressurize the vial. If the vial pressure is at or higher than the dosing pressure, an audible double injection will occur. If the vial pressure is too low, errors will occur on resin samples because of inadequate time for headspace gas equilibrium. This condition can be avoided by running several standard gas samples at various pressures around the calculated pressure, and then selecting the highest pressure that does not produce a double injection. All samples and standards must be pressurized for 60 seconds using the vial pre-pressurizer. The vial is then placed into the 90°C conditioning bath and tested for leakage by placing a drop of water on the septum at the needle hole.

c. Burner Air Supply. Set regulatory on cylinder to read 50 psig. Set regulator on chromatograph to supply air to burner at a rate between 250 and 300 cc/min. Check with bubble flowmeter.

d. Hydrogen Supply. Set regulator on cylinder to read 30 psig. Set regulator on chromatograph to supply approximately 35 ± 5 cc/min. Optimize hydrogen flow to yield the most sensitive detector response without extinguishing the flame. Check flow with bubble meter and record this flow.

8.3.1.2 Temperature Adjustments. Set temperatures as follows:

a. Oven (chromatograph column), 140°C.

b. Dosing Line, 170°C.

c. Injection Block, 170°C.

d. Sample Chamber, Water Temperature, 90°C ± 1.°0C.

8.1.3 Ignition of Flame Ionization Detector. Ignite the detector according to the manufacturer's instructions.

8.3.1.4 Amplifier Balance. Balance the amplifier according to the manufacturer's instructions.

8.3.2 Programming the Chromatograph. Program the chromatograph as follows:

a. I–Dosing or Injection Time. The normal setting is 2 seconds.

b. A–Analysis Time. The normal setting is approximately 70 percent of the VCM retention time. When the analysis timer terminates, the programmer initiates backflushing of the first column.

c. B–Backflushing Time. The normal setting is double the analysis time.

d. W–Stabilization Time. The normal setting is 0.5 minute to 1.0 minute.

e. X–Number of Analyses Per Sample. The nomal setting is 1.

8.3.3 Preparation of Sample Turntable. Before placing any sample into turntable, be certain that the center section of the aluminum cap has been removed. All samples and standards must be pressurized for 60 seconds by using the vial pre-pressurizer. The numbered sample vials should be placed in the corresponding numbered positions in the turntable. Insert samples in the following order:

Positions 1 and 2—Old 2000-ppm standards for conditioning. These are necessary only after the analyzer has not been used for 24 hours or longer.

Positions 3—50-ppm standard, freshly prepared.

Positions 4—500-ppm standard, freshly prepared.

Position 5—2000-ppm standard, freshly prepared.

Position 6—4000-ppm standard, freshly prepared.

Position 7—Sample No. 7 (This is the first sample of the day, but is given as 7 to be consistent with the turntable and the integrator printout.)

After all samples have been postitioned, insert the second set of 50-, 500-, 2000-, and 4000-ppm standards. Samples, including standards, must be conditioned in the bath of 90°C for 1 hour (not to exceed 5 hours).

8.3.4 Start Chromatograph Program. When all samples, including standards, have been conditioned at 90°C for 1 hour, start the analysis program according to the manufacturer's instructions. These instructions must be carefully followed when starting and stopping a program to prevent damage to the dosing assembly.

8.3.5 Determination of Total Solids (TS). For wet cake, slurry, resin solution, and PVC latex samples, determine TS for each sample by accurately weighing approximately 3 to 4 grams of sample in an aluminum pan before and after placing in a draft oven (105 to 110°C). Samples must be dried to constant weight. After first weighing, return the pan to the oven for a short period of time, and then reweigh to verify complete dryness. TS is then calculated as the final sample weight divided by initial sample weight.

9. *Calibration.*

Calibration is to be performed each 8-hour period when the instrument is used. Each day, prior to running samples, the column should be conditioned by running two 2000-ppm standards from the previous day.

9.1 Preparation of Standards. Calibration standards are prepared as follows: Place two drops of distilled water (with the use of an eyedropper) in the sample vial, then fill the vial with the VCM/nitrogen standard, rapidly seat the septum, and seal with the aluminum cap. Use a ⅛-in. stainless steel line from the cylinder to the vial. Do not use rubber or tygon tubing. The sample line from the cylinder must be purged (into a properly vented hood) for several minutes prior to fill the vials. After purging, reduce the flow rate to 500 to 1000 cc/min. Place end of tubing into vial (near bottom). Position a septum on top of the vial, pressing it against the ⅛-in. filling tube to minimize the size of the vent opening. This is necessary to minimize mixing air with the standard in the vial. Each vial is to be purged with standard for 90 seconds, during which time the filling tube is gradually slid to the top of the vial. After the 90 seconds, the tube is removed with the septum, simultaneously sealing the vial. Practice will be necessary to develop good technique. Rubber gloves should be worn during the above operations. The sealed vial must then be pressurized for 60 seconds using the vial pre-pressurizer. Test the vial for leakage by placing a drop of water on the septum at the needle hole.

9.2 Preparation of Chromatograph Calibration Curve.

Prepare two 50-, 500-, 2000-, and 4000-ppm standard samples. Run the calibration samples in exactly the same manner as regular samples. Plot A_s, the integrator area counts for each standard sample, versus C_c, the concentration of vinyl chloride in each standard sample. Draw a straight line through the points derived by the least squares method.

10. *Calculations.*

10.1 Response Factor. If the calibration curve described in section 9.2 passes through zero, a response factor, R_f, may be used to compute vinyl chloride concentrations. To compute a response factor, divide any particular A_s by the corresponding C_c.

$$R_f = A_s / C_c \qquad \text{Eq. 107-1}$$

If the calibration curve does not pass through zero, the calibration curve must be employed to calculate each sample concentration unless the error introduced by using a particular R_f is known.

10.2 Residual Vinyl Chloride Monomer Concentration, (C_{rvc}) or Vinyl Chloride Monomer Concentration. Calculate C_{rvc} in ppm or mg/kg as follows:

$$C_{rvc} = \frac{A_s\ P_a}{R_f\ T_1}\left[\frac{M_v\ V_g}{R\ m} + K_p\ (TS)\ T_2 + K_w\ (1 - TS)\ T_2\right] \qquad \text{Eq. 107-2}$$

Where:

A_s = Chromatograph area counts of vinyl chloride for the sample.

P_a = Ambient atmospheric pressure, mm Hg.

R_f = Response factor in area counts per ppm VCM.

T_1 = Ambient laboratory temperature, °K.

M_v = Molecular weight of VCM (62.5 g/mole).

V_g = Volume of the vapor phase, cm³.

R = Gas constant (62360 cm³ · mm Hg/mole · °K).

m = Sample weight, g.

K_p = Henry's Law Constant for VCM in PVC @ 90°C (6.52×10^{-6} g/g/mm Hg).

TS = Total solids expressed as a decimal fraction.

T_2 = Equilibrium temperature, °K.

K_w = Henry's Law Constant for VCM in water @ 90°C (7×10^{-7} g/g/mm Hg).

Assuming the following conditions are met, these values can be substituted into equation 107-2:

P_a = 750 mm Hg.

V_g = Vial volume—sample volume (Fisher vials are 22.0 cm³ and Perkin-Elmer vials are 21.8 cm³).

T_1 = 23°C or 296°K.

T_2 = 90°C or 363°K.

$$C_{rvc} = \frac{A_s\ 750}{R_f\ 296}\left[\frac{(62.5)\ 21.8 - \frac{m(TS)}{1.36} - \frac{m(1-TS)}{0.9653}}{62360\ m} + 6.25\times10^{-6}(TS)(363) + 7.0\times10^{-7}(1-TS)(363)\right]$$

Results calculated using these equations represent concentration based on the total sample. To obtain results based on dry PVC content, divide by TS.

11. *References.*

1. Residual Vinyl Chloride Monomer Content of Polyvinyl Chloride Resins, Latex, Wet Cake, Slurry and Water Samples, B. F. Goodrich Chemical Group Standard Test Procedure No. 1005-E. B. F. Goodrich Technical Center, Avon Lake, Ohio, October 8, 1979.

2. Berens, A. R., "The Diffusion of Vinyl Chloride in Polyvinyl Chloride," ACS—Division of Polymer Chemistry, Polymer Preprints 15 (2): 197, 1974.

3. Berens, A. R., "The Diffusion of Vinyl Chloride in Polyvinyl Chloride," ACS—Division of Polymer Chemistry, Polymer Preprints 15 (2): 203, 1974.

4. Berens, A. R., L. B. Crider, C. J. Tomanek and J. M. Whitney, "Analysis for Vinyl Chloride in PVC Powders by Head—Space Gas Chromatography," to be published.

[FR Doc. 80-35850 Filed 11-1[illegible]-80; 8:45 am]

40 CFR Part 61

[AD-FRL 1718-7]

National Emission Standards for Hazardous Air Pollutants; Test Methods; Revised Methods 106 and 107; Corrections

AGENCY: Environmental Protection Agency (EPA).

ACTION: Corrections.

SUMMARY: The following corrections should be made to the National Emission Standards for Hazardous Air Pollutants in the Federal Register of 45 FR 76346, Tuesday, November 18, 1980.

EFFECTIVE DATE: January 5, 1981.

FOR FURTHER INFORMATION CONTACT:

Mr. Roger Shigehara, Emission Measurement Branch (MD-19), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2237.

SUPPLEMENTARY INFORMATION: The following are the corrections: Page 76346.

1. First column: Change the date comments must be received by, to February 19, 1981.

2. First column: Delete the last paragraph, because this notice is a proposed rule.

3. Second column: Change the preamble to Appendix B to state: "It is proposed to amend 40 CFR 61 by revising Methods 106 and 107 of Appendix B as follows:"

Dated: December 29, 1980.

Edward F. Tuerk,

Acting Assistant Administrator for Air, Noise, and Radiation.

[FR Doc. 81-266 Filed 1-2-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[AD-FRL 1643-6]

National Emission Standards for Hazardous Air Pollutants; Alternative Test Method 107A (Vinyl Chloride)

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: The proposed method would apply to the measurement of the vinyl chloride content of solvents, resin-solvent solution, polyvinyl chloride resin, resin-slurry, wet resin, and latex samples. The proposed method was derived from a test method submitted to EPA by Union Carbide. The intent of this proposed method is to provide this alternative analytical procedure because it may be preferred over Method 107 in some circumstances.

A public hearing will be held to provide interested persons an opportunity for oral presentation of data views, or arguments concerning the proposed method.

DATES: *Comments.* Comments must be received on or before April 13, 1981.

Public Hearing. A public hearing will be held on March 26, 1981 (about 30 days after proposal) beginning at 9 a.m.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by March 19 (1 week before hearing).

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (A-130), Attention: Docket A-80-37, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, D.C. 20460.

Public Hearing. The public hearing will be held at Emissions Measurement Laboratory Building, Page Road and Interstate 40, R.T.P. North Carolina 27711. Persons wishing to present oral testimony should notify Ms. Deanna Tilley, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5421.

Docket. Docket No. A-80-37, containing material relevant to this rulemaking, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Roger T. Shigehara (MD-19), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2237.

SUPPLEMENTARY INFORMATION: On October 21, 1976 (41 FR 46560) and on June 7, 1977 (42 FR 29005) the Environmental Protection Agency promulgated Method 107—Determination of Vinyl Chloride Content of Inprocess Wastewater Samples and Vinyl Chloride Content of Polyvinyl Chloride Resin, Slurry, Wet Cake, and Latex Samples. Since that time, Union Carbide has submitted comparative supporting data to EPA on a test method that embodies a less sophisticated, but also technically satisfactory, analytical approach. Because practical considerations would favor its use in some instances, this alternative method is being considered for adoption as an EPA method. If adopted, this alternative test method would be available to determine compliance with the national emission standard for vinyl chloride, 40 CFR, Part 61 Subpart F.

(Secs. 112, 114, and 301(a) of the Clean Air Act as amended (42 U.S.C. 7412, 7414, and 760.(a)))

Dated: February 4, 1981.

Walter C. Barber,

Acting Administrator.

It is proposed to amend 40 CFR Part 61 by adding Method 107A to Appendix B as follows:

Appendix B—Test Methods

* * * * *

Method 107A—Determination of Vinyl Chloride Content of Solvents, Resin-Solvent Solution, Polyvinyl Chloride Resin, Resin Slurry, Wet Resin, and Latex Samples[1]

Introduction

Performance of this method should not be attempted by persons unfamiliar with the operation of a gas chromatograph or by those who are unfamiliar with source sampling because knowledge beyond the scope of this presentation is required. Care must be exercised to prevent exposure of sampling personnel to vinyl chloride, a carcinogen.

1. *Applicability and Principle.*

1.1 Applicability. This is an alternative method and applies to the measurement of the vinyl chloride content of solvents, resin solvent solutions, PVC resin, wet cake slurries, latex, and fabricated resin samples. This method is not acceptable where methods from Section 304(h) of the Clean Water Act, 33 U.S.C. 1251 et seq. (the Federal Water Pollution Control Act Amendments of 1972 as amended by the Clean Water Act of 1977) are required.

1.2 Principle. The basis for this method lies in the direct injection of a liquid sample into a chromatograph and the subsequent evaporation of all volatile material into the carrier gas stream of the chromatograph, thus permitting analysis of all volatile material including vinyl chloride.

2. *Range and Sensitivity.*

The lower limit of detection of vinyl chloride in dry PVC resin is 0.2 ppm. For resin solutions, latexes, and wet resin, this limit rises inversely as the nonvolatile (resin) content decreases.

With proper calibration the upper limit may be extended as needed.

3. *Interferences.*

The chromatograph columns and the corresponding operating parameters herein described normally provide an adequate resolution of vinyl chloride. In cases where resolution interferences are encountered, the chromatograph operator shall select the column and operating parameters best suited to his particular analysis problem, subject to the approval of the Administrator. Approval is automatic, provided that the tester produces confirming data through an adequate supplemental analytical technique, such as analysis with a different column or GC/mass spectroscopy, and has the data available for review by the Administrator.

4. *Precision and Reproducibility.*

A standard sample of latex containing 181.8 ppm vinyl chloride analyzed 10 times by the alternative method showed a standard deviation of 7.5 percent and a mean error of 0.21 percent.

A sample of vinyl chloride copolymer resin solution was analyzed 10 times by the alternative method and showed a standard deviation of 6.6 percent at a level of 35 ppm.

5. *Safety.*

Do not release vinyl chloride to the laboratory atmosphere during preparation of standards. Venting or purging with vinyl chloride monomer (VCM) air mixtures must be held to minimum. When purging is required, the vapor must be routed to outside air. Vinyl chloride, even at low-ppm levels, must never be vented inside the laboratory.

6. *Apparatus.*

6.1 Sampling. The following equipment is required:

6.1.1 Glass Bottles. 16-oz wide mouth with polyethylene-lined, screw-on tops.

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[1] Mention of trade names or specific products does not constitute endorsement by the U.S. Environmental Protection Agency.

6.1.2 Adhesive Tape. To prevent loosening of bottle tops.

6.2 Sample Recovery. The following equipment is required:

6.2.1 Glass Vials. 20-ml capacity with polycone screw caps.

6.2.2 Analytical Balance. Capable of weighing to ±0.01 gram.

6.2.3 Syringe. 50-microliter size, with removable needle.

6.2.4 Fritted Glass Sparger. Fine porosity.

6.2.5 Aluminum Weighing Dishes.

6.2.6 Sample Roller or Shaker. To help dissolve sample.

6.3 Analysis. The following equipment is required:

6.3.1 Gas Chromatograph. Hewlett Packard Model 5720A or equivalent.

6.3.2 Chromatograph Column. Stainless steel, 6.1 m by 3.2 mm, packed with 20 percent Tergitol E-35 on Chromosorb W AW 60/80 mesh. The analyst may use other columns provided that the precision and accuracy of the analysis of vinyl chloride standards are not impaired and that he has available for review information confirming that there is adequate resolution of the vinyl chloride peak. (Adequate resolution is defined as an area overlap of not more than 10 percent of the vinyl chloride peak by an interferent peak. Calculation of area overlap is explained in Appendix C, Supplement A: "Determination of Adequate Chromatographic Peak Resolution.")

6.3.3 Valco Instrument Six-Port Rotary Valve. For column back flush.

6.3.4 Septa. For chromatograph injection port.

6.3.5 Injection Port Liners. For chromatograph used.

6.3.6 Regulators. For required gas cylinders.

6.3.7 Soap Film Flow Meter. Hewlett Packard No. 0101–0113 or equivalent.

6.4 Calibration. The following equipment is required:

6.4.1 Analytical Balance. Capable of weighing to ±0.0001 g.

6.4.2 Erlenmeyer Flask With Glass Stopper. 125 ml.

6.4.3 Pipets. 0.1, 0.5, 1, 5, 10, and 50 ml.

6.4.4 Volumetric Flasks. 10 and 100 ml.

7. *Reagents.*

Use only reagents that are of chromatograph grade.

7.1 Analysis. The following items are required:

7.1.1 Hydrogen Gas. Zero grade.

7.1.2 Nitrogen Gas. Zero grade.

7.1.3 Air. Zero grade.

7.1.4 Tetrahydrofuran (THF). Reagent grade.

Analyze the THF by injecting 10 microliters into the prepared gas chromatograph. Compare the THF chromatogram with that shown in Figure 107A–1. If the chromatogram is comparable to A, the THF should be sparged with pure nitrogen for approximately 2 hours using the fritted glass sparger to attempt to remove the interfering peak. Reanalyze the sparged THF to determine whether the THF is acceptable for use. If the scan is comparable to B, the THF should be acceptable for use in the analysis.

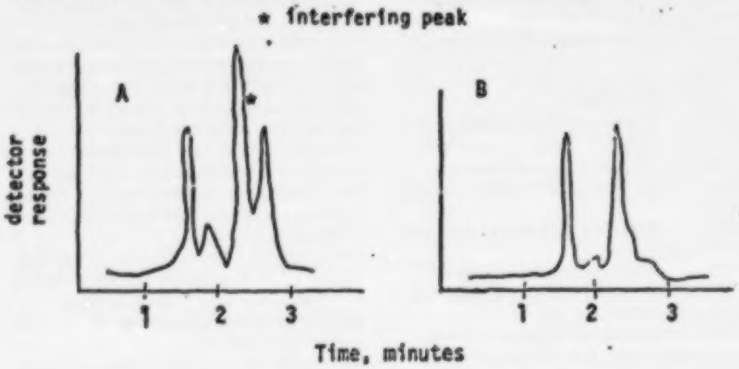

Figure 107A-1

7.1.5 N, N-Dimethylacetamide (DMAC). Spectrographic grade. For use in place in THF.

7.2 Calibration. The following item is required:

7.2.1 Vinyl Chloride 99.9 Percent. Ideal Gas Products lecture bottle, or equivalent. For preparation of standard solutions.

8. *Procedure.*

8.1 Sampling. Allow the liquid or dried resin to flow from a tap on the tank, silo, or pipeline until the tap has been purged. Fill a wide-mouth pint bottle, and immediately tightly cap the bottle. Place an identifying label on each bottle and record the date, time, sample location, and material.

8.2 Sample Treatment. Samples must be run within 24 hours.

8.2.1 Resin Samples. Weight 9.00 ± 0.01 g of THF or DMAC in a tared 20-ml vial. Add 1.00 ± 0.01 g or resin to the tared vial containing the THF or DMAC. Close the vial tightly with the screw cap, and shake or otherwise agitate the vial until complete solution of the resin is obtained. Shaking may require several minutes to several hours, depending on the nature of the resin.

8.2.2 Suspension Resin Slurry and Wet Resin Samples. Slurry must be filtered using a small Buchner funnel with vacuum to yield a wet resin sample. The filtering process must be continued only as long as a steady stream of water is exiting from the funnel. Excessive filtration time could result in some loss of VCM. The wet resin sample is weighed into a tared 20-ml vial with THF or DMAC as described earlier for resin samples (8.2.1) and treated the same as the resin sample. A sample of the wet resin is used to determine total solids as required for calculating the RVCM (Section 8.3.4).

8.2.3 Latex and Resin Solvent Solutions. Samples must be thoroughly mixed. Weigh 1.00 ± 0.01 g of the latex or resin-solvent solution into a 20-ml vial containing 9.00 ± 0.01 g of THF or DMAC as for the resin samples (8.2.1). Cap and shake until complete solution is obtained. Determine the total solids of the latex or resin solution sample (Section 8.3.4).

8.2.4 Solvents and Non-viscous Liquid Samples. No preparation of these samples is required. The neat samples are injected directly into the gas chromatograph.

8.3 Analysis.

8.3.1 Preparation of Gas Chromatograph. Install the chromatographic column, and condition overnight at 70°C. Do not connect the exit end of the column to the detector while conditioning.

8.3.1.1 Flow Rate Adjustments. Adjust the flow rates as follows:

a. Nitrogen Carrier Gas. Set regulator on cylinder to read 60 psig. Set column flow controller on the chromatograph using the soap film flow meter to yield a flow rate of 40 cc/min.

b. Burner Air Supply. Set regulator on the cylinder at 40 psig. Set regulator on the chromatograph to supply air to the burner to yield a flow rate of 250 to 300 cc/min using the flow meter.

c. Hydrogen. Set regulator on cylinder to read 60 psig. Set regulator on the chromatograph to supply 30 to 40 cc/min using the flow meter. Optimize hydrogen flow to yield the most sensitive detector response without extingushing the flame. Check flow with flow meter and record this flow.

d. Nitrogen Back Flush Gas. Set regulator on the chromatograph using the soap film flow meter to yield a flow rate of 40 cc/min.

8.3.1.2 Temperature Adjustments. Set temperature as follows:

a. Oven (chromatographic column) at 70°C.

b. Injection Port at 100°C.

c. Detector at 300°C.

8.3.1.3 Ignition of Flame Ionization Detector. Ignite the detector according to the manufacturer's instructions. Allow system to stabilize approximately 1 hour.

8.3.1.4 Recorder. Set pen at zero and start chart drive.

8.3.1.5 Attenuation. Set attenuation to yield desired peak height depending on sample VCM content.

8.3.2. Chromatographic Analyses.

a. Sample Injection. Remove needle from 50-microliter syringe. Open sample vial and draw 50-microliters of THF or DMAC sample recovery solution into the syringe. Recap sample vial. Attach needle to the syringe and while holding the syringe vertically (needle uppermost), eject 40 microliters into an absorbent tissue. Wipe needle with tissue. Now inject 10 microliters into chromatograph system. Repeat the injection until two consecutive values for the height of the vinyl chloride peak do not vary more than 5 percent. Use the average value for these two peak heights to compute the sample concentration.

b. Back Flush. After 4 minutes has elapsed after sample injection, actuate the back flush valve to purge the first 4 feet of the chromatographic column of solvent and other high boilers.

c. Sample Data. Record on the chromatograph strip chart the data from the sample label.

d. Elution Time. Vinyl chloride elutes at 2.8 minutes. Acetaldehyde elutes at 3.7 minutes. Analysis is considered complete when chart pen becomes stable. After 5 minutes, reset back flush valve and inject next sample.

8.3.3 Chromatograph Servicing.

a. Septum. Replace after five sample injections.

b. Sample Port Liner. Replace the sample port liner with a clean spare after five sample injections.

c. Chromatograph Shut Down. If the chromatograph has been shut down overnight, rerun one or more samples from the preceding day to test stability and precision prior to starting on the current day's work.

8.3.4 Determination of Total Solids (T.S.). For wet resin, resin solution, and PVC latex samples, determine the T.S. for each sample by accurately weighing approximately 3 to 5 grams of sample into a tared aluminum pan. The initial procedure is as follows:

a. Where water is the major volatile component: Tare the weighing dish, and add 3 to 5 grams of sample to the dish. Weigh to the nearest milligram.

b. Where volatile solvent is the major volatile component: Transfer a portion of the sample to a 20-ml screw cap vial and cap immediately. Weigh the vial to the nearest milligram. Uncap the vial and transfer a 3- to 5-gram portion of the sample to a tared aluminum weighing dish. Recap the vial and reweigh to the nearest milligram. The vial weight loss is the sample weight.

To continue, now place the weighing pan in a 130°C oven for 1 hour. Remove the dish and allow to cool to room temperature in a desiccator. Weigh the pan to the nearest 0.1 mg. Total solids is the weight of material in the aluminum pan after heating divided by the net weight of sample added to the pan originally times 100.

9. *Calibration of the Chromatograph.*

9.1 Preparation of Standards. Prepare a 1 percent by weight (approximate) solution of vinyl chloride in THF or DMAC by bubbling vinyl chloride gas from a cylinder into a tared 125-ml glass-stoppered flask containing THF or DMAC. The weight of vinyl chloride to be added should be calculated prior to this operation, i.e., 1 percent of the weight of THF or DMAC contained in the tared flask. This must be carried out in a laboratory hood. Adjust the vinyl chloride flow from the cylinder so that the vinyl chloride dissolves essentially completely in the THF or DMAC and is not blown to the atmosphere. Take particular care not to volatize any of the solution. Stopper the flask and swirl the solution to effect complete mixing. Weigh the stoppered flask to nearest 0.1 mg to determine the exact amount of vinyl chloride added.

Pipet 10 ml of the approximately 1 percent solution into a 100-ml glass-stoppered volumetric flask, and add THF or DMAC to fill to the mark. Cap the flask and invert 10 to 20 times. This solution contains approximately 1,000 ppm by weight of vinyl chloride (note the exact concentration).

Pipet 50-, 10-, 5-, 1-, 0.5-, and 0.1-ml aliquots of the approximately 1,000 ppm solution into 100 ml glass stoppered volumetric flasks. Dilute to the mark with THF or DMAC, cap the flasks and invert each 10 to 20 times. These solutions contain approximately 500, 100, 50, 10, 5, and 1 ppm vinyl chloride. Note the exact concentration of each one. These standards are to be kept under refrigeration in stoppered bottles, and must be renewed every 3 months.

9.2 Preparation of Chromatograph Calibration Curve.

Obtain the gas chromatograph for each of the six final solutions prepared in Section 9.1 by using the procedure in Section 8.3.2. Prepare a chart plotting peak height obtained from the chromatogram of each solution versus the known concentration. Draw a straight line through the points derived by the least squares method.

10. *Calculations.*

10.1 Response Factor. From the calibration curve described in Section 9.2, select the value of C_c that corresponds to H_c for each sample. Compute the response factor, R_f, for each sample as follows:

$$R_f = \frac{C_c}{H_c} \qquad \text{Eq. 107A-1}$$

10.2 Residual vinyl chloride monomer concentration (C_{rvc}) or vinyl chloride monomer concentration in resin:

$$C_{rvc} = 10H_s\ R_f \qquad \text{Eq. 107A-2}$$

Where:

H_s = Peak height of sample, mm.

R_f = Chromatograph response factor.

10.3 Samples containing volatile material, i.e., resin solutions, wet resin, and latexes:

$$C_{rvc} = \frac{H_s\ R_f(1,000)}{T.S.} \qquad \text{Eq. 107A-3}$$

10.4 Samples of solvents and inprocess waste water:

$$C_{vc} = \frac{H_s\ R_f}{0.888} \qquad \text{Eq. 107A-4}$$

Where:

0.888 = Specific gravity of THF.

11. *Bibliography.*

1. Communication from R.N. Wheeler, Jr.; Union Carbide Corporation. Part 61 National Emissions Standards for Hazardous Air Pollutants Appendix B, Method 107—Alternate Method, September 19, 1977.

[FR Doc. 81-4980 Filed 2-11-81; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

POLICY AND PROCEDURES FOR IDENTIFYING, ASSESSING AND REGULATING AIRBORNE SUBSTANCES POSING A RISK OF CANCER

APPENDIX C

40 CFR Part 61

[FRL 1259-1]

National Emission Standards for Hazardous Air Pollutants; Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer

AGENCY: Environmental Protection Agency.

ACTION: Proposed rulemaking.

SUMMARY: This notice proposes for comment a rule governing the policies and procedures to be used by the Environmental Protection Agency in the identification, assessment, and regulation under the Clean Air Act of substances which, when emitted into the ambient air for stationary sources, increase the risk of cancer to the general population. The proposed policy implements for the air program of EPA the principles adopted by the President's Regulatory Council in a statement issued September 28, 1979 on the regulation of chemical carcinogens. In concert with this proposal, EPA is publishing elsewhere in today's **Federal Register** an advance notice of proposed rulemaking soliciting comments on draft generic work practice and operational standards which could be applied quickly to reduce emissions of airborne carcinogens from certain source categories.

Under the proposed policy, EPA would evaluate available information to identify those substances, including radioactive materials, which should be considered for regulation under the Clean Air Act as airborne carcinogens. Any air pollutant determined to present a significant carcinogenic risk to human health as a result of air emissions from one or more categories of stationary sources would be listed under section 112 as a hazardous air pollutant. Listing under section 112 would be accompanied, where applicable, by the proposal of generic standards for source categories producing or handling significant quantities of the substance. The generic standards would rapidly effect reasonable control of emissions while more detailed analyses are performed to establish priorities for further regulation, determine available control technology, and assess regulatory impacts.

Final standards for source categories presenting significant risks to public health would, as a minimum, require such sources to use best available technology to reduce emissions. If, however, the risk remaining after the application of best available technology is determined to be unreasonable, further control would be required. Unreasonable residual risk determinations would consider the risk remaining, the benefits conferred by the substance or activity, the distribution of those benefits versus the distribution of risks, the availability of substitutes, the costs of further control of the substance or source categories, and proposed sites in the case of new sources. Standards would be reviewed at no more than five-year intervals.

DATES: Written comments should be postmarked no later than February 7, 1980.

Notice of intent to appear at a public hearing should be postmarked no later than November 26, 1979. Hearing dates and locations, which will be held during the comment period, will be announced in the **Federal Register.**

Written comments responding to, supplementing, or rebutting written or oral comments received at public hearing must be made within 60 days of the hearing date.

ADDRESSES: All written comments should be addressed to: Central Docket Section, Room 2903B, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460, ATTN: *OAQPS 79-14.*

EPA has established a rulemaking docket consistent with procedures established by section 307(d)(1)(N) of the Clean Air Act (42 U.S.C. 7607(d)). The docket number is *OAQPS 79-14* and it already contains the documents on which this proposal is based. All comments received during the comment period, as well as any other documents used in the promulgation of the final rule will be added to the docket promptly. The docket number should be on all written comments. The docket will be open for inspection at the Central Docket section at the above address between 8:00 a.m. and 4 p.m. Monday through Friday.

Notice of intent to appear at a public hearing should be directed to: Joseph Padgett, Director, Strategies and Air Standards Division (MD-12), Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Additional copies of this notice are available from: Industry Assistance Office, Office of Toxic Substances, U.S. EPA, 401 M Street, SW., Washington, D.C. 20460, 800-424-9065 (toll free) (202) 554-1404.

FOR FURTHER INFORMATION CONTACT: Joseph Padgett, Strategies and Air Standards Division, (919) 541-5204, FTS 629-5204.

SUPPLEMENTARY INFORMATION: *Availability of related information:* As described above, documents upon which this proposal is based are available for public inspection in the rulemaking docket (OAQPS 79-14). In addition to these materials, this notice includes a supplemental statement of basis and purpose containing further discussion of the legal basis for the proposed policy, various alternative control strategies considered, and comparisons with other carcinogen policy proposals. This statement follows the text of the proposed rule.

I. Background: The Need for a Policy and a Regulatory Mechanism

A. Introduction

The principal focus of the nation's air pollution control program to date has been the establishment and implementation of standards related to six major pollutant (particulate matter, sulfur oxides, ozone, nitrogen oxides, carbon monoxide, and lead). Recently, increasing attention has been directed towards those toxic components of air pollution which may not be adequately controlled by current programs. Pollutants that may contribute to the occurrence of human cancer have received particular attention because of the nature and seriousness of this group of diseases, and because of recent findings suggesting that a large number of airborne chemicals and radionuclides to which people are exposed may be implicated in cancer and other diseases related to genetic damage. *(1, 2, 3)*

B. The General Cancer Problem

The nature and magnitude of the cancer problem in the United States and the fact that radioactive agents and some chemicals can produce cancer in animals and humans have been well-documented and publicized.[1] Some of the more important aspects of the occurrence and causes of cancer and the role played by air pollution are briefly summarized below.

(1) Nature and Magnitude of the Problem *(4, 5, 6, 7, 8)*

Cancer is a group of diseases characterized by the unrestrained growth of cells that have somehow lost an essential self-regulatory mechanism. The uncontrolled growth of these cells eventually threatens the life of the host organism. Cancer is currently the second leading cause of death in the United States. One American in four is expected to contact some form of cancer in his or her lifetime, and one in five is expected to die from the disease. The most recent statistics show a continued increase in total cancer incidence, due principally to increases in lung cancer.

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[1] Detailed discussion of the general features of the problem have been presented by the Occupational Safety and Health Administration *(4)*, the Consumer Product Safety Commission *(5.)*, and others *(6)*.

The social, economic, and human costs of cancer are immense. Most forms of cancer are difficult if not impossbile to cure; less than one-half of all cancer patients live longer than five years from the discovery of their illness. The elusiveness of cures is due largely to the fact that cancer's basic biological mechanisms at the cellular level are not well understood. Approximately 1.8 billion dollars are spent each year for hospital care of cancer patients; significant additional costs not readily estimated include doctor's fees, out-patient therapy, and drug costs. In addition, it is estimated that 1.8 million work-years are lost annually because of cancer.

(2) Causes of Cancer: Importance of Environmental Factors

Studies of human cancer rates, their worldwide geographical variations, and observations of incidence rates in migrant populations have revealed that factors in the human environment are probably responsible for a large proportion of cancers. "Environmental factors" must be understood in the broad sense to include chemical exposures from smoking, diet, occupation, drinking water, and air pollution; various forms of radiation, including sunlight; and some forms of severe physical irritation. Although the uncertainties are great, estimates by the World Health Organization, other prominent institutions, and individual experts have suggested that 60 to 90 percent of all human cancers may be due to these factors. *(37, 9.)*

Studies of cancer incidence in particular groups have shown strong statistical relationships between exposure to certain chemical or radioactive substances and specific cancers. The connection between tobacco smoke and lung and other cancers is the most widely known.*(35)* Significant increases in leukemia and other forms of cancer have been noted among Japanese survivors of atomic bomb explosions during World War II. Markedly elevated cancer rates are found among certain occupational groups in the United States and other highly industrialized countries. In general, cancer rates are higher than average in urban areas.*(10)*.

Unequivocal identification and quantification of the specific factors that lead singly or in combination with factors to specific forms of cancer in humans is, however, an extraordinarily difficult task. Observation from human experience is complicated by a number of factors. Purposeful experimentation of humans, for example, is ethically unacceptable, since the result would often be fatal. Definitive epidemiological studies of occupationally exposed groups are often difficult because the relatively small population exposed and inadequate information about duration, magnitude, and circumstances of exposures may not permit statistically reliable conclusions to be drawn. Studies of the cuases of cancer in the general population may be equivocal because of the complex modes of exposure, low exposure levels, and other complicating factors. In addition, synergistic and antagonistic interactions between chemicals substantially complicate any conclusions about the effects of a particular chemical.

Another major difficulty in the interepretation of such studies is the long latency period exposure to carcinogens and onset of the disease. Most cancers observed in today's population probably had their origins in exposures that began 15 to 40 years ago.*(38, 11)* Thus, epidemiological studies in current populations must involve estimation of historical exposures. The latency period also means that epidemiology cannot detect effects of relatively new substances until years of exposure have occurred.

To date, epidemiological studies have identified only 26 environmental agents believed to increase cancer risks in humans. *(12)*. The casual relationships implied by the statistical connections in these studies have generally been supported by controlled experiments on animals. With the possible exceptions of benzene and arsenic, those factors known to produce cancer in humans also produce cancer in test animals.*(34)* Animal experiments have also implicated many additional chemical substances as potential human carcinogens.

In addition to the potential that a substance acting alone may induce cancer, there is evidence that exposure to certain combinations of carcinogenic and non-carcinogenic agents may promote or potentiate the carcinogenic response. The disproportionate risk of lung caner to cigarette smokers occupationally exposed to asbestos fibers*(36, 37)* is an example of the synergism of two known human carcinogens. Non-carcinogenic and co-carcinogenic substances may also act to promote or enhance the human response to carcinogen exposure.

Although airborne carcinogens may induce cancer at a number of body sites, lung cancer is thought to be the principal form of cancer related to air pollution.*(15)* While cigarette smoking is probably the most important cause of lung cancer in the United States,*(16, 35)* many scientists believe that various air pollutants increase the risk of cancer from smoking and other carcinogenic insults. Available estimates also indicate that occupational exposures are responsible for a significant portion of lung cancer incidence in the United States*(10, 17)*.

Because of the difficulties inherent in studying the causes of cancer and the multifactorial nature of human exposures, the role of each major exposure pathway remains a matter of some debate. While factors such as smoking, occupational exposures, diet, and solar radiation are probably responsible for a greater proportion of cancers than ambient air pollution alone, (*10, 13, 14*) the dimensions of the problem posed by airborne carcinogens remain significant. Besides their contribution to cancers primarily related to other pathways, airborne carcinogens themselves pose risks to large numbers of people. In certain industrialized areas, especially, composite national figures may mask significantly higher air pollution-related cancer risks. And, in the vicinity of specific sources of carcinogenic emissions, risks to individuals can reach very high levels.

A preliminary EPA examination of chemical production, industries producing radioactive materials, and air sampling results has identified over fifty known or potential chemical carcinogens and numerous radioactive materials which may be emitted to the atmosphere. Many of these substances are synthetic organic chemicals that have been in commercial use only since the 1930's. (*18*) Since cancer induced by exposures to small amounts of airbone carcinogens may not appear for 15 to 40 years after exposure, it is still too early to detect the full impacts of these chemicals on human health. Thus, it is both prudent and, in view of the large number of people potentially affected, important to reduce or contain emissions of known or suspected atmospheric carcinogens in order to prevent future problems before they actually are observed.

C. Problems in Regulating Airborne Carcinogens

(1) Introduction

Although significant reductions in emissions of airborne carcinogens have resulted indirectly from control of pollutants such as particulate matter (*19*) and volatile organic chemicals (*20*) under sections 109 and 111 of the Clean Air Act,[2] EPA has taken direct regulatory action to control air carcinogens primarily under section 112.[3] Section 112, National Emission Standards for Hazardous Air Pollutants (NESHAPs), provides for the listing of pollutants which in the judgement of the Administrator cause or contribute to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness. After a substance is listed as a hazardous air pollutant, EPA must establish control requirements for various source categories which emit the substance. The standards must, in the judgment of the Administrator, provide an ample margin of safety to protect the public health from such hazardous air pollutants. Carcinogens that have been listed under section 112 to date include asbestos, beryllium,[4] vinyl chloride, and benzene. A number of specific emission source categories of these substances have been regulated. (*21, 22*)

A number of scientific, technical, and policy problems have arisen which complicate the regulation of airborne carcinogens under section 112. Significant delays in establishing standards have been associated with determining the appropriate degree of control for certain sources of listed carcinogens. Although the determination of whether and to what degree a particular chemical presents a risk of cancer to humans has not yet been a significant source of delay under section 112, future disagreements are anticipated. This may be particularly true when dealing with substances for which epidemiological data are not available. These problems and their consequences are discussed in the following sections.

(2) Difficulty in Determining Carcinogenicity

The carcinogenic substances listed under section 112 to date were recognized as human carcinogens on the basis of epidemiological evidence. For most other chemical substances, however, such evidence will not be available, and other means of assessing carcinogenicity will have to be employed.

Protection of public health from current and future cancer risks therefore requires reliance on the results of laboratory tests, primarily involving animals, in the identification of probable human carcinogens. Practical limitations require that most animal tests be conducted with much smaller numbers of subjects than the human populations they represent, and at doses much higher than ambient exposure levels to improve the detectability of carcinogenic effects.

Evaluation of the carcinogenic risk to humans, based on such animal tests of candidate substances, raises a number of issues. Among these are the differences between species, extrapolation from the high doses administered to animals to the low concentrations present in the ambient air, differences in routes of exposure (e.g., ingestion versus inhalation), the significance of benign tumors, and the question of no-effect "thresholds" at lower exposures. Since animal testing is of key importance in carcinogen identification, policy decisions must be made and articulated on each of these issues.

(3) Problems Associated With the Large Number of Potential Air Carcinogens and Sources

Further difficulties in dealing with air pollution-related cancer result from the large number of potential atmospheric carcinogens and the correspondingly large number of sources emitting them. Preliminary analyses have identified a number of source types which may emit carcinogenic substances to the atmosphere. Most of these types fall into one of the following six broad groups: (1) mining, smelting, refining, manufacture and end-use of minerals and other inorganic chemicals; (2) combustion; (3) petroleum refining, distribution, and storage; (4) synthetic organic chemical industries and end-use applications, and waste disposal; (5) mining, processing, use, and disposal of radioactive substances and radioactive by-products; and (6) non-carcinogenic emissions which are chemically transformed into carcinogens in the atmosphere.

A survey of several thousand potential toxicants emitted from one broad category, the synthetic organic chemical industry, has identified over six hundred organic chemicals of possible concern. (*18*) Of these, over 140 showed some indication of possible carcinogenicity, mutagenicity, or teratogenicity. The results of a preliminary analysis of these substances suggest that as many as 40 of these substances are of concern as potential air carcinogens. (*29*) Although the synthetic organic chemical industry comprises the largest source grouping, a number of additional organic and inorganic air pollutants of concern, and a number of radioactive materials, are emitted from the other source categories.

Currently, EPA has only limited information on the emission rates, sources, and atmospheric concentrations of most potential airborne carcinogens. As a result of the generally low ambient concentrations expected from emissions of many of these substances, as well as their large number, source emissions testing and atmospheric monitoring programs will be more sophisticated and expensive, but less accurate or precise, then traditional air pollution monitoring. The resources necessary for developing such programs and for evaluating the health effects and control alternatives for this large number of substances and sources far exceed those currently available to EPA for the task. Clearly, priorities must therefore be established to maximize the public health benefits obtainable with existing resources.

(4) Difficulty in Determining the Appropriate Degree of Control

As noted above, a central problem in establishing standards and reqirements for air carcinogens under section 112 of the Clean Air Act has been determining the appropriate degree of control which should be required for significant source categories. The difficulty is related both to the characteristics of carcinogens and to the requirement of section 112 that the public health be protected with "an ample margin of safety."

As discussed above, most identifications of substances as probable human carcinogens have been based on studies of humans or animals exposed to relatively high doses of the substances. Whether the smaller doses generally encountered in the ambient environment cause cancer or, whether instead, some threshold or "safe" level of exposure may exist is a matter of considerable scientific debate. (*23*) EPA and other public health agencies and groups have, as a matter of prudent health policy, taken the position that in the absence of identifiable effect thresholds, carcinogens pose some risk of cancer at any exposure level above zero. The existence of risk at any exposure level has created difficulty in setting required control levels. Some commenters have maintained that no risks should be permitted from emissions of carcinogens, while others argue that, in view of the uncertainty that any effect will occur at low exposure levels, only feasible and clearly cost-effective controls should be required.

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[2] 42 U.S.C. Sections 7409 and 7411.

[3] 42 U.S.C. Section 7412. Since the Clean Air Act provides for separate treatment of mobile source emissions under Title II, this policy addresses only air emissions from stationary sources. At this time, carcinogenic emissions from stationary sources appear to present a larger and more diverse public health problem than mobile source emissions.

[4] Beryllium was listed because of its non-carcinogenic toxic properties.

This difficulty has been compounded by the language of section 112 itself, which calls for the establishment of standards which, in the judgment of the Administrator, provide "an ample margin of safety to protect the public health" from hazardous air pollutants. This language clearly mandates that the primary factor in standard-setting under section 112, in contrast to some other sections of the Act, such as section 111, be the protection of public health. How this mandate should be translated into standards for airborne carcinogens, however, is not clear. This uncertainty has led to delay and litigation, with some arguing that the *only* factor that may be considered is health effects, while others contend that EPA should simply balance risk against the cost of control and the benefits of the activity, giving all factors equal weight. While EPA has made limited statements *(21, 22)* of its view of section 112, the Administrator has not expressed a comprehensive interpretation of the provision as it applies to the regulation of carcinogens until now.

(5) EDF Petition

Citing concerns over the limited number of carcinogens listed as hazardous air pollutants to date and the regulatory delays encountered in controlling vinyl chloride, the Environmental Defense Fund (EDF), in November 1977, petitioned EPA to adopt a generic approach for classifying and regulating carcinogenic air pollutants under the Clean Air Act *(30)*.

The EDF proposal is patterned on the classification system proposed by OSHA and is based on scientific criteria similar to those articulated by CPSC, OSHA, and EPA for carcinogenicity determinations.[5] Suspect substances would be grouped into three categories (confirmed, probable, possible) based on the availability evidence of carcinogenicity. Under the main feature of the policy suggested by EDF, a determination that an air pollutant is a confirmed carcinogen would trigger the following responses: (a) immediate listing as a hazardous air pollutant under section 112; and (b) proposal and promulgation of regulations to (1) either ban the use of the material if a suitable substitute exists, or to require the application of emissions or equipment standards representing best available control technology; (2) establish a timetable leading to the reduction of emissions to zero at both existing and new sources; and (3) prevent any increase in emissions from additions to or replacements of existing facilities.

In March 1978, EPA conducted a public meeting to receive comments on the EDF proposal and any other suggestions regarding the Agency's regulatory process for the control of airborne carcinogens *(31, 32)*[6]. One major presentation made at that meeting was by the American Industrial Health Council (AIHC), advocating the use of a central board of non-governmental scientists for evaluating carcinogenicity and carcinogenic potency of substances of interest for all federal regulatory agencies *(33)*. The principles AIHC recommended for determination of carcinogenicity differ somewhat from those proposed by EPA, CPSC, and OSHA. AIHC also recommended that standards be set independently for each substance through a process of "balancing" predicted cancer incidence, costs of control, and benefit of the substance regulated. While AIHC gave examples of alternative balancing procedures which might be used, it did not recommend any specific course of action to EPA for use under section 112.

(6) Need for an Air Carcinogen Policy

The problems associated with the determination of carcinogenicity, the large number of potential carcinogens, and the appropriate level of control of emitting sources contribute to delays in decisions to list carcinogenic substances as hazardous air pollutants as well as to delays in establishing control requirements under section 112. Indeed, EPA has listed only three air pollutants as carcinogens under section 112 since 1970. Therefore, given the potentially large number of airborne carcinogens which may require control, the general unavailability of epidemiological data for determining carcinogenicity and potential risks, the requirements of section 112, and EPA's experience under section 112 to date, the Administrator has concluded that the establishment of a comprehensive and coherent policy and set of procedures for regulatory action in dealing with airborne carcinogens is imperative.

Specifically, publicly-stated, legally binding policies and regulatory mechanisms are needed for: (1) determining the carcinogenicity and carcinogenic risks of air pollutants for regulatory purposes; (2) establishing priorities for evaluating the need for and accomplishing additional regulatory action; (3) specifying the degree of control required in general under section 112 and how that level of control will be determined in setting individual standards; and (4) providing more extensive public involvement in the Agency's decisionmaking on the regulation of airborne carcinogens. Among the benefits of adopting such a policy, in addition to more expeditious control of probable carcinogens, are increased public understanding of and participation in EPA's actions and the providing of earlier notice of EPA's findings and intent to state and local regulatory authorities and to industries.

II. Discussion of the Proposed Rule

A. Introduction

The provisions of the proposed rule are stated formally at the end of this notice. The following sections present the Agency's rationale for, and describe the operation of, the proposed policy. Certain related issues, including the detailed legal basis of the proposal, the consideration of various alternatives, and a comparison with other policies, are discussed in a supplemental statement of basis and purpose following the text of the proposed rule. The Administrator intends to publish a finding at the time of the promulgation of this rule stating that the rule is based on determinations of nationwide scope and effect. The provisions of section 307(b) of the Act, 42 U.S.C. section 7607(b), will therefore limit judicial review to the U.S. Court of Appeals for the District of Columbia Circuit, and litigation of the issues posed by this rule will not be available in connection with subsequent rulemakings in which it is applied.

Pending final promulgation of the rule, as it may be modified after public comment, EPA will generally follow the proposed policy and procedures in actions taken in the interim. Such actions are expected to be listing decisions or regulatory proposals for specific substances, so that EPA will be able to reflect, in final regulatory action on such substances, any changes made in the proposed rule after public comment.

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[5] A comparison of these approaches is presented in the supplemental statement which follows the text of the proposed rule.

[6] The comments received at that meeting have been considered in the formulation of today's proposal.

B. Identification and Preliminary Evaluation of Health Risks

This section describes the principles and procedures that EPA will use in identifying potential airborne carcinogens and in determining whether emissions of such substances pose significant risks to public health. These principles and procedures address determinations in three fundamental areas: (1) the generic determination that the presence of airborne carcinogens in relatively low ambient concentrations warrants regulatory action, (2) the identification of specific candidate substances for EPA assessment, and (3) the assessment of whether such substances pose significant risks to public health.

(1) The Need for Concern About Relatively Low Doses

The Administrator's belief that ambient concentrations of carcinogens represent a significant public health risk warranting regulatory action is based on the current understanding of the biological effects of these substances at low concentrations. Essentially, two hypotheses exist. The non-threshold hypothesis assumes that cancer can result from the interaction of as little as one molecule of a carcinogen with a critical receptor in one cell.

The threshold hypothesis, in contrast, assumes that there is a no-effect dose of a carcinogen below which induction of cancer cannot occur. This hypothesis argues that, at small doses, chemical carcinogens can be detoxified through metabolic processes, resulting in some level of exposure which produces no carcinogenic response, or that repair mechanisms or cell death may prevent the development of cancer from a single damaged cell.*(23)*

The public health community has generally concluded that evidence for identifiable dose thresholds does not exist for carcinogens. Under this view, any exposure to a carcinogenic substance carries a risk of cancer. A recent report by the National Academy of Sciences*(24)* offers the following observations in support of this conclusion:

> Consideration of the Dose-Response Relationship. In considering the possibility of thresholds for carcinogenesis, it is important to understand that there is no agent, chemical, or physical, which induces in man a form of cancer that does not occur in the absence of that agent. In other words, *when there is exposure to a material, we are not starting at an origin of zero cancers. Nor are we starting at an origin of zero carcinogenic agents in our environment. Thus, it is likely that any carcinogenic agent added to the environment will act by a particular mechanism on a particular cell population that is already being acted on by the same mechanism to induce cancers.* This reasoning implies that the only way for a new carcinogen added to the environment to have a threshold in its dose-response curve would be if it were acting by a mechanism entirely different from that already being experienced by that tissue.
>
> Examination of Experimental Dose-Response Curves. The most extensive information on carcinogenesis both in experimental animals and in humans is with ionizing radiation. Although there is evidence implicating thresholds in some animal tissues, thresholds have in general not been established for most tissues. If such thresholds exist, they occur at sufficiently low doses that it would require massive, expensive, and impracticable experiments to establish them. In view of the common finding—for example, a linear dose-response relationship (unaffected by dose-rate)—of cancer induction in animals by high LET [Linear Energy Transfer] radiation, it is unlikely that such thresholds exist. Linearity is not essential to the no-threshold argument since nonlinear, dose-response relationships do not necessarily imply the existence of thresholds . . .
>
> Heterogeneity of the Population. The human population in the United States—the population we are trying to protect—is a large, diverse, and genetically heterogeneous group exposed to a variety of toxic agents. Genetic variability to carcinogenesis is well-documented (Strong, 1976), and it is also known that individuals who are deficient in immunological competence (for genetic or environmental reasons) are particularly susceptiple to some forms of cancer (Cottier, et al., 1974).
>
> It seems, therefore, that even if we were to postulate an average threshold for a particular cancer induced by a particular agent, we would in practice need a series of thresholds for different individuals. It would be extremely difficult, in practice, to establish a single threshold.
>
> We conclude from these arguments that, despite all the complexities of chemical carcinogenesis, thresholds in the dose-response relationships do not appear to exist for direct-acting carcinogens. If they do exist, they are unlikely to be detected and, hence, impossible to use. This means that there can be no totally "safe" exposure to a particular carcinogen. (Emphasis added.)

EPA has therefore made a generic determination that, in view of the existing state of scientific knowledge, prudent public health policy requires that carcinogens be considered for regulatory purposes to pose some finite risk of cancer at any exposure level above zero. The Administrator believes that this is consistent with the mandate of section 112 requiring the protection of public health against air pollutants which "may reasonably be anticipated" to cause or contribute to the health effects of concern, and the application of an "ample margin of safety" in making such public health judgments.

(2) Identification and Screening of Potential Airborne Carcinogens

Potential airborne carcinogens are now and will continue to be identified through various EPA programs, including searches of the scientific literature, monitoring studies, and biological assays of substances found in ambient air and source emissions, as well as by examining information obtained from federal, state, or other regulatory authorities, private research groups, and other scientific sources. Suspect substances (compounds or mixtures) identified in this manner will be screened to provide a rough estimate of the potential extent of public exposure resulting from ambient air emissions. Screening is essential for two reasons: first, to optimize the use of Agency resources in view of the growing number of substances of concern, and second, to distinguish between those substances which may, through their presence in the air, present carcinogenic risks and those which, although probably carcinogenic, are not emitted in quantities sufficient to pose such risks.

Readily available information will be collected on the intentional and inadvertent production of such substances and their uses, volatility, and other chemical and physical properties. Ambient air measurements and previous scientific assessments will be considered where available. Appropriate offices within EPA and other relevant agencies will be contacted to determine whether any regulatory actions, assessments, or screening activities are underway.

Suspect substances to which the screening process indicates the public is probably exposed through ambient air will receive further attention to evaluate the likelihood that they pose significant carcinogenic risks. Priorities for these evaluations will be assigned based on the expected potential for public exposure to the substances. In some cases, EPA may determine after screening that regulatory actions under other laws administered by EPA or by other regulatory agencies eliminate the need for further EPA action under the Clean Air Act. Otherwise, potential airborne carcinogens will be evaluated for the likelihood that they pose significant risks to public health.

These procedures are already in operation. As noted above, screening of over 140 potential airborne carcinogens has yielded of 40 for which carcinogenicity determinations and preliminary exposure assessments are underway. These determinations are excepted to be largely completed by December 1979.

(3) Evaluation of Significance of Risk to Public Health[7]

The determination of significant carcinogenic risk will be based on assessments in two areas: the probability that the substance is a human carcinogen, and the extent of human exposure via the ambient air.

(a) *Evaluation of the Probability of Human Carcinogenicity.* The criteria for evaluating the probability that an airborne substance presents a carcinogenic risk to humans are not unique to the air, but are conceptually the same as those for substances present in any exposure medium. It would thus be inappropriate for EPA to use a novel set of criteria for airborne substances alone. Accordingly, in determining the carcinogenic risk posed by air pollutants, EPA will use the criteria specified in general guidelines adopted by the Agency. The EPA "Interim Guidelines for Carcinogen Risk Assessment" ("Interim Guideline") issued on May 25, 1976 *(25)* outlines the basic scientific criteria and policy judgments currently used by EPA in evaluating evidence regarding suspect carcinogens. This guidance is supplemented by the recent release for comment by the Risk Assessment Work Group of the Interagency Regulatory Liaison Group (IRLG)[8] of a scientific review of the principles and methods applicable to the identification and assessment of human risk from carcinogens. *(26)*

In evaluating the likelihood that a substance is carcinogenic in humans under EPA's Interim Guideline and the IRLG Work Group report, available information is considered and judgments concerning the probability of human carcinogenicity are made based on the quality and weight of evidence. The information principally relevant to such an evaluation includes epidemiological and animal or other laboratory studies.

The available information is evaluated in light of the following criteria:

> Judgments about the weight of evidence involve considerations of the quality and adequacy of the data and the kinds of responses induced by the suspect carcinogen. The *best evidence* that an agent is a human carcinogen comes from epidemiological studies in conjunction with confirmatory animal tests. *Substantial evidence* is provided by animal tests that demonstrate the induction of malignant tumors in one or more species including benign tumors that are generally recognized as early stages of malinancies. *Suggestive evidence* includes the induction of only those non-life-shorting benign tumors which are generally accepted as not progressing to malignancy and indirect tests of tumorigenic activity, such as mutagenicity, *in vitro* cell transformation, and initiation-promotion skin tests in mice. *Ancillary* reasons that bear on judgments about carcinogenic potential, e.g., evidence from systematic studies that relate chemical structure to carcinogenicity, should be included in the assessment. *(25)*

This "weight of evidence" evaluation outlined in the Interim Guideline does not involve automatic categorization of carcinogenic probability, but rather evaluates the nature of the evidence in each case. Once the evidence has been weighted, of course, the conclusions must be useful for regulatory decisions. For this reason, substances which have been evaluated will be grouped into three broad categories (high, moderate, low) according to the probability of carcinogenicity. Assignment to a particular regulatory category will be made on a case-by-case basis, and will reflect the strength of the evidence that the substance in question is a human carcinogen in comparison with the range of other substances which have been evaluated for regulatory action. In general, substances for which "best" or "substantial evidence" as described above exists will be considered for designation as high-probability human carcinogens for purposes of section 112. Substances for which only "suggestive" evidence exists will be considered for designation as moderate-probability human carcinogens. Substances for which only "ancillary" evidence exists will be considered for designation as low-probability human carcinogens.

EPA recognizes that a range of scientific uncertainty exists within these broad evidentiary classes. For example, a substance which has been found to be carcinogenic in all animal species and sexes tested may be more likely to be carcinogenic in humans than a substance tested in several species and found to produce tumors in only one sex of one species. Although upon consideration of the relative strength of evidence it may be concluded that both substances should be considered high-probability human carcinogens, the extent of uncertainty will be considered on a case-by-case basis.

(b) *Preliminary Evaluation of Ambient Exposure.* EPA will also determine whether a suspect airborne carcinogen is emitted into or present in the ambient air in such a way that significant human exposure results. While the threshold of significance for the ambient exposure determination will be relatively low, some consideration of exposure levels is appropriate to avoid initiating regulatory action under the Clean Air Act for substances such as "laboratory curiosities" which are very unlikely to be present in the ambient air in measureable quantities. This preliminary exposure evaluation is designed to make that distinction.

In the preliminary assessment of ambient exposure, EPA will consider available data on ambient concentrations of the substance, the number and nature of emitting sources, and the number of people living near the sources or in areas in which ambient concentrations have been reported. Where possible, preliminary estimates of lifetime individual risks to the potentially most exposed individuals, based on estimates of carcinogenic strength, will also be calculated.

The preliminary exposure assessment will not be designed to produce the more detailed information appropriate in deciding what control measures may be necessary; that information, including detailed quantitative assessments of risk, will also be developed where possible by EPA, but is not required for the determination of significant ambient exposure.

C. Initial Responses to Preliminary Assessments of Health Risks

The evaluation of the significance of risk to public health will be used to identify those substances for which, in the judgment of the Administrator, there is sufficient evidence to warrant listing under section 112 as airborne carcinogens. For substances which fall short of meeting the criteria for this determination, or for which available information is not sufficient to make a determination, the proposed policy provides for alternative responses. The following paragraphs describe EPA's specific responses to various possible evaluations under the proposed rule.

(1) Listing Under Section 112: Significant Risk

Any subtance judged by the Administrator to present significant carcinogenic risks to the public will be listed under section 112 as a hazardous air pollutant. The finding of significant carcinogenic risk is based on the judgment that a substance has a high probability of human carcinogenicity, and evidence of significant public exposure via the ambient air from emissions from one or more categories of stationary sources.

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[7] Today's notice deals only with the carcinogenic hazards of an air pollutant. A substance may also be regulated under section 112 due to its non-carcinogenic health effects, or due to a combination of carcinogenic and other serious effects. Non-carcinogenic effects of substances being reviewed as possible airborne carcinogens will also be evaluated and considered where information on those effects is available.

[8] IRLG Agencies include Environmental Protection Agency, Occupational Safety and Health Administration, Consumer Product Safety Commission, Food and Drug Administration, and Foods Safety and Quality Service (U.S. Department of Agriculture). The Occupational Safety and Health Administration, however, did not participate in the joint issuance of the Risk Assessment Work Group report.

A high-probability carcinogen may also be listed under section 112 if a preliminary quantitative risk assessment suggests that there is a significant risk to the potentially most exposed groups as a result of emissions of the substance. These preliminary assessments of risk will be considered as supplemental evidence that listing is warranted where the available evidence before the Administrator is otherwise insufficient to indicate the existence of a significant risk. In the judgment of the Administrator, it would not be prudent health policy to base a decision not to list upon a preliminary risk estimate in the presence of qualitative evidence of significant human exposure.

The limitation of the role of these preliminary risk assessments to supplementary evidence in support of a finding of significant risk is based on the Administrator's judgment that these quantitative estimates are too imprecise and uncertain to use as a factor in deciding *not* to list a substance. The Administrator does believe, however, that despite their considerable uncertainty it would be imprudent to ignore assessments suggesting the existence of significant risk, especially in light of the limited direct consequences of listing. The Administrator's views concerning the use of quantitative risk assessment under this proposal are discussed in greater detail elsewhere in this notice.

The timing of the listing decision for a given airborne carcinogen will depend on the nature of the information available to the Administrator. Initially available information will often be adequate to conclude that emissions of the sustance present a significant risk to the public. If so, listing would occur immediately upon that finding. Sometimes, however, the preliminary assessments will not provide enough information to allow the Administrator to decide if emissions of a substance present a significant risk. Where that is the case, further information will be obtained to allow a determination to be made. Substances for which exposures are potentially substantial will be assigned high priority for this further effort.

The purposes of this "early" listing approach are: to increase the priority of a substance for further action, to facilitate the expeditious application of clearly necessary control measures to certain sources, to accelerate the process by which final regulatory decisions are made, and to provide for earlier public notice of the Agency's views and increased public participation in the regulatory decision-making process. Paragraphs (a) and (b) below describe the immediate consequences of listing under the proposed policy.

(a) *Listing Where Generic Standards Are Applicable.* As explained more fully in a companion advance notice of proposed rulemaking (ANPR) elsewhere in today's **Federal Register**, EPA has developed a draft set of low-cost and readily implemented control procedures and work practices that can be applied to control emissions from various categories of sources producing, consuming, and handling significant quantities of a broad class of substances (volatile organic chemicals) sharing certain properties. Where substances listed as carcinogens under section 112 are emitted from source categories to which these "generic standards" could apply, the application of the standards would be proposed immediately upon listing.

The draft generic standards published elsewhere in the notice as an Advance Notice of Proposed Rulemaking (ANPR) were developed from information and efforts of EPA's Synthetic Organic Chemical Manufacturing Industry (SOCMI) standards development program. This program was initiated in 1976 to gather technical and cost data on the control of air pollution from organic chemical manufacturing and to prepare (1) new source performance standards (NSPS) for total volatile organic compound (VOC) emissions, (2) control techniques guidelines (CTG) for VOC emissions, and (3) section 112 standards for specific volatile organic chemical emissions.

The SOCMI program has focused its efforts on four kinds of emissions: (1) emissions from storage tanks and transportation vessels, (2) fugitive leaks and spills of VOC, (3) losses of VOC from liquid and solid wastes, and (4) emissions from process vents. Information-gathering, analysis, and standards development are at various stages in these four areas, and the program's goal is to develop generic standards in each area. The draft generic standards in today's ANPR, dealing with leaks and spills of VOC, represents the first generic application of information developed by the SOCMI program to standards under section 112. As further information becomes available from the program relating to the other kinds of emissions under study, EPA intends to develop further generic standards for use in conjunction with section 112. EPA would expect to follow a public pariticpation and regulatory development process similar to that of today's ANPR in connection with the development of additional generic standards.

The draft generic standards which are contained in today's ANPR would apply to a large proportion of the organic chemical industry, and are based on the similarity of many operations and equipment throughout the industry. Examples of required procedures are the periodic inspection for and reporting of fugitive leaks and subsequent repair, and the painting of storage tanks white to reduce volatilization of organics. Since most of the potientially carcinogenic chemical air pollutants identified by preliminary surveys to date have been organic chemicals, these generic standards would be expected to apply to the significant sources of most of the chemical carcinogens which might be listed.

In general, the applicablility of the draft generic standards would be dependent on the characteristics of source operations and the quantity of the substance which is produced or handled. The application of the draft generic standards would be proposed only for sources dealing with significant quantities of the listed substance, and some "tailoring" of the standards may be necessary for source categories of each listed pollutant. Sources currently meeting the requirements of such standards would effectively be required to continue doing so. The purpose of the immediate proposal of the generic standards is to ensure that risk reduction which can quickly and easily be achieved through the implementation of clearly appropriate "good housekeeping" measures is not delayed by the further assessments and detailed analyses which will be conducted before final regulatory decisions are made.

These initial regulatory requirements would not be applicable to all airborne carcinogens, and would not necessarily represent the degree of control which may ultimately be required. Because the draft generic standards currently address only fugitive emission sources, further standards will have to be developed individually to control process emissions from significant source categories. As further generic standards are developed for the remaining types of emission points and processes, the extent to which further control requirements will have to be developed and applied on a case-by-case basis will decrease significantly.

(b) *Listing Where Generic Standards Are Not Applicable* While a substantial majority of the substances which will be listed under section 112 as airborne carcinogens are expected to be chemicals to which generic standards could apply, there will be other substances such as inorganics or radioactive materials emitted from source categories for which generic standards have not been developed. In these cases, listing of a substance will trigger the assignment of a priority for the development of final emission regulations for significant categories of sources emitting the substance.

(2) Regulation Under Section 111: Moderate Probability of Carcinogenicity and High Exposures

Substances for which the probability of human carcinogenicity is moderate to low generally will not be considered for immediate regulation as carcinogens under section 112. If analysis suggests high exposures to a substance of "moderate probability," however, the resulting risk of cancer to the general population remains of concern. Such a substance will therefore undergo further assessment and, unless that assessmet indicates the substance is a high-probability carcinogen, will be considered for interim regulation under section 111 of the Clean Air Act.

Under section 111, new and existing sources may be regulated if they cause or contribute to "air pollution which may reasonably be anticipated to endanger public health or welfare." While a substance of only moderate probability of carcinogenicity would not generally "be reasonably anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness," high exposures to that substance certainly may *endanger* public health. Such a substance may therefore be regulated under section 111.

(3) Further Assessment or Testing

EPA will conduct, recommend, or request that others conduct further biological testing on low or moderate probability substances. Testing may include both cancer and other toxicity assays with priorities based on the extend of public exposures.

(4) Quantitative Risk Assessments for Listed Carcinogens

EPA will conduct a quantitative risk assessment, if possible, for any substance which has been listed under section 112 as a carcinogen. While such quantitative assessments are subject to considerable uncertainty, the Administrator believes that they can provide useful information for two phases of the proposed policy: establishing priorities for regulation of specific source categories of listed pollutants, and determining the degree of control required in final emission standards for those source categories. In assigning priorities for risk assessments, consideration will be given to the likelihood of significant exposures, the effect of any generic standards proposed, carcinogenic strength (potency), and the feasibility of expeditious control.

(a) *Nature of Quantitative Risk Assessments.* Quantitative risk estimates at ambient concentrations involve an analysis of the effects of the substance in high-dose epidemiological or animal studies, and extrapolation of these high-dose results to relevant human exposure routes at low doses. The mathematical models used for such extrapolations are based on observed dose-response relationships for carcinogens and assumptions about such relationships as the dose approaches very low levels or zero. *(23), (25), (26)* Examples of such models are the linear non-threshold model and the log probit model. *(25)* Often, assumptions must be made regarding the relevance of studies involving doses given through feeding or other pathways in extrapolating to inhalation exposures. Where only animal studies exist, additional assumptions must be made concerning "mouse to man" extrapolations.

The risks to public health from emissions of a high-probability carcinogen may be estimated by combining the dose-response relationship obtained from this carcinogenicity strength calculation with an analysis of the extent of population exposure to the substance through the ambient air. Exposure in this context is a function of both the concentraton of a substance and the length of time the concentration is encountered. A detailed exposure analysis will estimate likely exposures for long-term temporal trends, short-term maximum levels, and weighted averages for both the total population exposed and subgroups whose exposures may be significantly greater or otherwise different from the average.

Although ambient monitoring data will be used whenever possible, exposure analyses will often be based on the use of air quality models, available estimates of emissions from significant source categories, and approximations of population distributions near the source categories. Similar models may be used to estimate exposure through other pathways ultimately resulting from air emissions. Detailed air quality models will be used to estimate the range of pollutant exposures associated with each major source category. The air quality models used will generally permit estimation of exposures of up to 20 kilometers and and in some cases 80 kilometers from individual sources. Population and growth statistics will be examined to allow projections to be made of future exposures. The information collected, tegether with the existing carcinogenic strength determinations, will be used to provide estimates of the degree of risk to individuals and the range of increased cancer incidence expected from ambient air exposures associated with source categories of the carcinogenic air pollutant at various possible emissions levels.

(b) *Uncertainties in the assessment of Risk.* The assumptions and procedures discussed above for extrapolation and for exposure estimates are subject to considerable uncertainty. Where only animal data are available to assess the magnitude of cancer risk to human populations, the differences in susceptibility between animal species and humans, and the need to extrapolate dose-response data to very low ambient concentrations, result in risk estimates that must be regarded only as rough indications of effect. *(25)*

Uncertainty in exposure estimates arises from the use of limited monitoring, pollutant transport models, mobility of the exposed population and other factors. In combining these exposure estimates with dose-response extrapolations to provide estimates of cancer incidence, the total uncertainties are increased.

The primary model that EPA will use to estimate carcinogenic risk from exposure to a particular substance will be the linear non-threshold dose/response model. This model has been chosen in order to avoid understating the risk calculated from the extrapolation of the effects osbserved at high doses to the lower doses characteristic of ambient exposure. To the extent possible, the range of uncertainty in the risks extrapolated from animal studies to humans and from high to low doses will be described.

The decision to employ estimates of carcinogic risks despite their lack of precision rests on the belief that although they are subject to considerable uncertainties, current analytical models and techniques can, with due consideration of the uncertainties, provide useful estimates of relative carcinogenic strength and of the probable general ranges of excess cancer incidence and individual risks. This view has been supported by the National Academy of Sciences, *(24)* the National Cancer Advisory Board, *(27)* and others. *(28)*

D. Establishment and Review of Emission Standards and Related Requirements

(1) Introduction

A central issue in developing a policy for the protection of public health from carcinogens is the determination of the extent to which exposures must be reduced. Given the impossibility of identifying levels of carcinogens with no associated risk, some have argued that no exposure should be tolerated and that emissions should be reduced as expeditiously as practicable to zero. Others contend that permissible exposures should be determined by an unstructured balancing of risks, costs, and benefits.

A number of approaches for addressing the appropriate level for control of carcinogens have been considered or proposed by the federal regulatory agencies, industrial groups, environmental organizations, and others. Prominent examples include the OSHA proposal, the CPSC policy,[*] and the EDF petition on airborne carcinogens. A discussion of the suggested alternatives is presented in the supplemental statement which follows the text of the proposed rule. The following sections describe the approach proposed by EPA.

(2) The Proposed EPA Approach

The standard-setting policy proposed today requires, as a minimum, the use of "best available technology" (BAT) to control emissions from source categories presenting significant risks to public health. The policy would also require additional controls, as necessary, to eliminate "unreasonable residual risks" remaining after the use of best available technology. This approach is a judgmental one, designed to protect the public health with an ample margin of safety from risks associated with exposure to airborne carcinogens. The implementing procedure described below puts prime emphasis on public health, consistent with section 112, but permits consideration of economic impacts and benefits of the activity in setting standards for each source category. Uncertainties in the assessments of risks, costs, and potential benefits, as well as the distributional (equity) problems of various situations, would also be considered in setting standards.

(a) *Source Categories Regulated*

The first step in establishing standards and requirements for pollutants listed under section 112 under this proposed policy is the determination of which categories of sources emitting the pollutants will be regulated, and in what order regulations will be developed. Although a pollutant may have been listed because emissions from a particular source category pose a significant risk, other source categories may also emit the pollutant in lesser amounts. This may occur, for example, because the sources process very little of the substance, because the substance is present in only trace amounts in the sources' raw materials, or because sources have installed adequate controls on their own initiative or in response to other regulatory requirements.

The Administrator will therefore propose regulations only for those source categories which may pose significant risks to public health. The determination of whether a source category emitting a listed pollutant poses a significant risk will be made on essentially the same basis as the listing decision, except that the more detailed exposure analysis and risk assessement then available will be used in lieu of the preliminary information used in the listing decision. As in the listing decision, the risk assessment will be used to indicate the existence of a significant risk where the exposure analysis alone is insufficient, but will not be used as evidence that a significant risk does not exist where the exposure analysis indicates to the contrary.

(b) *Priorities for Development of Standards.* EPA anticipates that a substantial number of substances will be listed as carcinogenic air pollutants under section 112 in the near future. It is also likely that many of these substances will be emitted in significant quantities from more than one source category. As a result, EPA will need to develop emission standards and other requirements for a large number of source categories emitting these substances. At least until generic standards can be developed for large groups of these sources, the resources that would be necessary to complete this task immediately far exceed those available to EPA for this purpose. Today's proposal therefore provides for the assignment of priorities to significant source categories for the development of these regulations, through publicly stated criteria and announced decisions.

Under today's proposal, source categories posing significant risks will be assigned priority status (high, medium, or low) for further regulatory action (beyond generic standards) on the basis of: (1) the magnitude of projected total excess cancer incidence associated with current and future source emissions; (2) magnitude of cancer risks for the most exposed individuals; (3) ease of expeditious standards development and implementation; and (4) feasibility of significant improvements in controls. In addition, significant sources of more than one carcinogen may be given priority over single-pollutant sources, based on the sum of risks from the emitted substances.

A high priority will be assigned, for example, to a source category constituting an important problem requiring immediate attention, or where risks are somewhat lower but an appropriate regulatory solution is both feasible and readily available. Source categories assigned medium priority will generally be those that present lower risks and will be scheduled for standard development as resources become available. Lower risk source categories for which the extent of feasible control may be substantially limited will be assigned low priority for regulation development. Assignment to the low priority category will generally mean that active development of regulations will not begin until there is some change in the factors which led to the assignment, or until higher priority actions have been completed.

(c) *Regulatory Options Analysis.* EPA will perform detailed analyses to identify alternative, technologically feasible control options and the economic, energy, and environmental impacts that would result from their application. Where substitution is determined to be a feasible option, the benefits of continued use of the substance or process will be considered. These analyses will rely primarily on the procedures and techniques employed by EPA for developing New Source Performance Standards under section 111 of the Act.

The identification of feasible control options will initially survey the existing control devices at the sources within a particular category to determine the best controls currently in use. The potential emission points of the listed pollutant at a particular kind of facility will also be identified, as will possible emissions of carcinogens other than the specific one under study. EPA will, in addition, examine the applicability of available technologies which are not currently used by the industry to control the pollutant of concern (technology transfer) but which have been demonstrated in pilot tests or other industrial applications. Finally, the availability and adequacy of substitutes which would eliminate some or all emissions of the pollutant will be assessed.

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[*] The CPSC interim policy has been rescinded, 44 FR 23821 (April 23, 1979).

Once the technologically feasible control alternatives, which may range from no further control to a complete ban on emissions, have been identified, the environmental, economic and energy impacts of these options will be determined. Considerations in these impact assessments will include for each option: the number of plant closures predicted and the direct impact on employment and end product prices; the impact on growth and expansion of the industry; the resulting changes in profitability; capital availability for control equipment; the impacts from the availability of substitute products and foreign imports; the potential increases in national energy consumption; and the impacts on other environmental medial including increased water pollution and solid waste disposal. On the basis of these assessments, one of the control options identified will be designated as the "best available technology" for the control of emissions from the sources in the category. This level of control will be that technology, which in the judgment of the Administrator, is the most advanced level of control adequately demonstrated, considering economic, energy, and environmental impacts.

The control level designated "best available technology" may be different for new and existing facilities in a category. For practical purposes, this level of control for new sources will, as a minimum, be equivalent to that which would be selected as the basis for a New Source Performance Standard (NSPS) under section III. The requirement of "best available technology" for new sources would consider "economic feasibility" and would not preclude new construction.

The selection of BAT for existing sources may require consideration of the technological problems associated with retrofit and related differences in the economic, energy, and environmental impacts. In practice, BAT for existing sources would consider economic feasibility and would not exceed the most advanced level of technology that at least most members of an industry could afford without plant closures.

(d) *Minimum Requirements for Existing Sources.* Final section 112 standards will require existing sources in any regulated source category, as a minimum, to limit their emissions to the levels corresponding to the use of "best available technology." This requirement is based on the Administrator's' judgment that any risks that could be avoided through the use of these feasible control measures are unreasonable. Whether BAT controls are sufficient to protect public health will be determined by a subsequent evaluation of the remaining risks.

(e) *Determination of Unreasonable Residual Risk for Existing Sources.* Following the identification of BAT for existing sources, the quantitative risk assessment described earlier will be used to determine the risks remianing after the application of BAT to the source category. If the residual risks are not judged by the Administrator to be unreasonable, further controls would not be required. If, however, there is a finding of unreasonable residual risk, a more stringent alternative would be required. Among the possible alternatives would be the immediate application of more restrictive emission standards, including those based on more extensive use of substitutes, and scheduled or phased reductions permissible emissions. The alternative selected would be that necessary, in the Administrator's judgment, to eliminate the unreasonable residual risks.

Given the differences in the degree of certainty in risk estimates, in the numbers of people exposed, in benefits, in the distribution of risks and benefits, in the costs of controls, in the availability of substitutes, and in other relevant factors, it is not possible to state any precise formula for determining unreasonable residual risk. The determination will necessarily be a matter of judgment for each category involved. Nevertheless, the process followed and the various factors involved can be outlined.

The determination of unreasonable residual risk will be based primarily on public health, and will require protection with an ample margin of safety. To the extent possible, quantitative or qualitative estimates of various factors will be made for purposes of comparison. Among these are: (1) the range of total expected cancer incidence and other health effects in the existing and future exposed populations through the anticipated operating life of existing sources; (2) the range of health risks to the most exposed individuals; (3) readily identifiable benefits of the substance or activity; (4) the economic impacts of requiring additional control measures; (5) the distribution of the benefits of the acitivity versus the risks it causes; and (6) other posseible health and environmental effects resulting from the increased use of substitutes.

(f) *The Degree of Control Required for New Sources.* The need to focus independently on new sources of carcinogenic emissions stems principally from the nature of the threat posed by airborne carcinogens. Because of the lag time betweeen exposure to a carcinogen and onset of the disease, any assessment of the magnitude of the problem posed by current exposure levels is subject to considerable uncertainty, since the consequences have not yet become manifest. Decisions on the appropriate level of control must take into account the possibility that the dimensions of the current problem have been underestimated.

It also appears likely that the activities causing current carcinogenic emissions will continue to expand, and that new ones will appear. Since new emissions would threaten an increased cancer incidence, it is incumbent upon the Agency to meet that threat in advance, especially if that can be done free of some of the constraints associated with the reduction of risks from existing sources.

The policy of developing separate requirements for new sources is based on two additional considerations. First, many of the factors affecting risks can be controlled to a significant extent before new construction takes place. Foremost among these factors is siting: new sources in heavily populated areas create much greater cancer risks than those locating in less populated areas. In addition, new sources can sometimes apply control technology more cheaply and effectively than existing sources, since new sources: (1) are often larger and can thus benefit from the economies of scale; (2) can engineer the integration of emission controls from the ground up; and (3) do not have existing control equipment which must be dismantled or scrapped.

Second, given these differences, a determination of the appropriate control level for new sources on the basis of unreasonable residual risk may also weigh the relevant factors differently. While the focus for existing sources is primarily the balancing of health risks against the costs of retrofit controls beyond BAT, for new sources the balance can focus more heavily on siting, the benefits of the activity, and the possibility of fundamental changes in the process which would lower emissions.

For these reasons, the Administrator proposes to include in this policy a mechanism dealing specifically with new sources. Under this mechanism, described in more detail below, the standards applicable to new and modified sources would be determined on a case-by-case basis, and would consist of either (a) a presumptive emission standard, (b) the best available technology standard, or (c) an alternative standard. Regulations concerning procedures for the approval of construction or modification under section 112 standards (40 CFR 61.07) would be amended to reflect the requirements of the proposed policy, if it is adopted.

The Administrator recognizes that the mechanism proposed here is somewhat complex. After extensive consideration, however, this procedure appears to be the approach most likely to satisfy the policy and practical needs described above, within the constraints imposed by section 112. The Administrator actively solicits comment on the procedure, and particularly on possible alternative means to achieve the same objectives.

(1) Presumptive Emission Standards

EPA will prescribe a presumptive national emission standard for each regulated source category. This standard will prescribe a maximum emission rate and will be based solely on potential health effects. The presumptive standard will be designed to preclude the existence of significant risks under projected worst case assumptions of plant size and emissions, surrounding population density and distribution, and meteorology. Any proposed new source which would meet this limit would be certified for construction under section 112(c) (1)(A) without further demonstration or analysis.

(2) Waiver to Best Available Technology

Any new source meeting Risk Avoidance Criteria (described below) specified for each regulated source category will be granted an automatic waiver of the applicable presumptive emission standard, and will instead be required to meet the best available technology standard. Risk Avoidance Criteria will be designed to recognize actual conditions more favorable than the worst case assumptions used as the basis for the presumptive emission standard. Waivers will be granted, upon application of the source during the certification process, where, as a result of those different conditions, emissions greater than the level of the presumptive emission standard would not result in risks greater than those associated with the presumptive emission standard. The criteria to be met, in general form, are:

(a)(1) Population density and distribution around the proposed site at the sources's proposed emission rate are within limits specified by EPA. These limits will be set to allow carefully-sited sources, whose emissions using best available technology under specified siting conditions would not result in significant risks, to receive automatic waivers; and

(2) The proposed source is not within a specified distance of a source of carcinogens regulated under section 112; or

(b) An offset against new emissions can be obtained either internally (existing sources seeking to expand) or from existing sources of carcinogens regulated under section 112 within a specified distance. This criterion is intended to allow automatic waivers to best available technology where exposure to people already at risk from recognized carcinogenic emissions would not increase as a result.

(3) Establishment of Alternative Standard

Any proposed source unable to qualify for an automatic waiver to best available technology would be eligible to apply to EPA for the establishment of an alternative standard applicable to that source. The alternative standard would be based on the avoidance of unreasonable residual risk after the use of best available technology, and may range from the presumptive emission standard to best available technology. In establishing an alternative standard, the Administrator would generally consider the same factors as in an unreasonable residual risk determination for existing sources. The relevant factors include:

(a) the range of total expected cancer incidence and other serious health effects associated with emissions of the source throughout its anticipated operating life;

(b) the range of health risks to the most exposed individuals from the source's emissions;

(c) existing risks to the affected population from emissions of the listed pollutant and other carcinogenic air pollutants;

(d) readily identifiable benefits of the substances or the activity producing the risk;

(e) the economic and technological feasibility of further control measures;

(f) the distribution of the benefits of the activity versus the distribution of risks;

(g) other possible health effects resulting from the use of substitutes for the substance or activity; and

(h) the extent to which possible emissions offsets may be obtained.

(3a) Summary of the Legal Basis for Proposed EPA Standard-Setting Approach

As noted earlier, EPA has experienced considerable difficulty in interpreting and applying the requirement of "an ample margin of safety to protect the public health" in setting standards for carcinogenic air pollutants under section 112 of the Clean Air Act. The factual aspects of the problem are first, as explained above, that airborne carcinogens appear to have no identifiable thresholds (minimum exposure levels) for adverse health effects; second, that in many cases the individual risks they present at ambient concentrations may be extremely small; and third, that total elimination of those risks could require the closure of some of the nation's basic industries. The corresponding problem of legal interpretation is that Congress does not appear to have addressed this situation when enacting section 112.

For the reasons discussed in more detail in the supplemental statement of basis and purpose following this notice, the Administrator has concluded that although it is possible to read section 112 as requiring regulation designed to protect health absolutely, Congress has not expressed any clear intention to require the total elimination of risks posed by carcinogenic air pollutants. The Administrator therefore believes that, in light of the legislative history of section 112 and of the Act as a whole, the most reasonable interpretation of that section requires him to focus principally on health protection in regulating airborne carcinogens but does not require the total elimination of risks from such substances. Consequently, it is the Administrator's judgment that standards set under the policy proposed today will protect the public health with an ample margin of safety. These conclusions are reinforced by the likelihood that Congress would have provided much clearer guidance had it intended the drastic results that would flow from a requirement to eliminate totally all risks from airborne carcinogens.

(4) Public Notification and Involvement

(a) *Screening, Identification, and Assessment.* The results of the preliminary screening process, determinations of carcinogenicity, preliminary exposure analyses, and decisions on listing, proposal of generic regulations, and further analysis and testing will be published in the Federal Register. This notification will serve to advise the public, state and local agencies, and industry of the potential hazards associated with the substances examined, will indicate which substances are receiving further attention, and will request the involvement of interested parties.

(b) *Listing, Quantitative Risk Assessments, and Determination of Regulatory Priorities.* The development of regulations is a time-consuming process. While the use of generic standards and the initial focus on regulating the most significant sources first will accelerate the process of reducing risks to public health, it is likely that regulation of medium and lower priority sources will not be completed for a number of years. To insure that the public, industry, and the states are aware of the status of federal regulatory efforts, the results of risk assessments and priority determinations will be published in the **Federal Register.** These notices will include decisions and recommended actions on all substances under review.

(c) *Proposal and Promulgation of Standards.* Upon the proposal of generic or final regulations for source categories of listed airborne carcinogens, EPA will hold public hearings and solicit written comments on the proposed rulemaking. Records of such hearings and comments received will be made available for public inspection through the maintenance of public dockets.

(5) Preparation of Regulatory Analyses

This proposal is classified as a major regulation under EPA's final report implementing Executive Order 12044 "Improving Government Regulations" (44 FR 30988) in that it addresses a "major health or ecological problem." The Executive Order requires that a regulatory analysis of potential economic impacts be prepared for major regulations meeting certain criteria. The criteria are, in brief: 1) additional costs of compliance totalling $100 million; 2) additional costs of production exceeding 5 percent of the selling price of the product; or 3) the Administrator requests such an analysis.

The procedures outlined in the proposed rule are intended to guide the Agency in the identification and control of airborne carcinogens under the principal authority of section 112 of the Clean Air Act. The policy does not impose regulatory requirements on any emission source and, therefore, does not meet either of the economic criteria for preparing a regulatory analysis. The purpose of the policy is to establish a framework for EPA decisions including the conduct of economic and risk analyses of subsequent regulatory actions. To attempt to quantify the impact of future regulations requiring unidentified controls on unknown source categories of, as yet, unnamed pollutants would not, in the judgment of the Administrator, be a meaningful exercise.

While an economic analysis is not considered appropriate for this proposed procedural rule, EPA has considered possible regulatory alternatives. A discussion of relevant issues is presented in the supplemental statement of basis and purpose which follows the text of the proposed rule.

(6) Periodic Review

At intervals of no more than five years, regulations promulgated for each source category of airborne carcinogens will be reviewed for possible modification, based on recent technological developments and any new health effects information available. This will provide an opportunity to consider the tightening of standards for existing sources to reflect new technology, and the application of innovative technologies for new sources. At the conclusion of each review, standards will be revised to reflect more stringent control requirements, or the existing standards may be reaffirmed, as appropriate.

(Sections 111, 112, and 301(a) of the Clean Air Act, as amended, 42 U.S.C. sections 7411, 7412, and 7601(a).)

Dated: August 22, 1979.

Douglas H. Costle,
Administrator.

The Administrator proposes to add the following rule as Appendix C to Part 61 of Title 40 of the Code of Federal Regulations:

Appendix C—Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer

I. Introduction

A. Scope of Rule

This rule specifies the policies used by EPA in the regulation of stationary sources of potentially carcinogenic air pollutants under relevant Clean Air Act authorities, principally section 112. The rule does not affect regulation of non-carcinogenic hazardous substances under section 112[10] or supplemental regulation of airborne carcinogens under other Agency authorities where applicable.

B. Statement of General Policy

(1) The EPA policy for regulation of sources emitting airborne carcinogens under section 112 of the Clean Air Act is to protect the public health with an ample margin of safety. This protection will be achieved by requiring the elimination of unreasonable residual risks from existing sources as quickly as possible, and by preventing the development of such risks from new sources.

(2) The presence of "unreasonable residual risks" to an affected population will be determined independently for each category of sources regulated. Primary emphasis in this determination will be on the level of risk remaining after the installation of the "best available technology" for the control of emissions from sources in the category. In evaluating this risk, consideration will be given to the benefits conferred by the substance or activity, the distribution of those benefits versus the distribution of the risks presented by the substance or activity, the availability of substitutes, the cost of further control of the substance or source category, and the proposed siting of new sources.

II. Preliminary Assessment of Health Risks

A. Identification of Candidate Substances

Potential airborne carcinogens (candidate substances) will be identified through EPA programs, including searches of the scientific literature, monitoring studies, and biological assays of substances found in the ambient air and source emissions, as well as by examining information obtained from federal, state, or other public testing or regulatory authorities, private research groups, and other scientific sources.

B. Screening

Candidate substances will be screened to determine the potential extent of exposure of the public through air emissions.

(1) Screening of candidate substances will consist of an analysis of readily available information on their production, uses, properties, air concentrations, and of other indices useful in assessing the potential for public exposure. EPA will also ascertain whether any other regulatory efforts are in progress with respect to these substances.

(2) Substances which the identification and screening process indicates (a) may be carcinogenic and (b) the public probably is exposed to via the ambient air will be evaluated to determine whether they pose a significant carcinogenic risk to the public. Substances with the greatest apparent potential for public exposure will be given highest priority for this further examination.

C. Preliminary Evaluation of Risk

The preliminary evaluation of the risks posed by a candidate substance will consist primarily of an evaluation of the probability that it is a human carcinogen and a preliminary evaluation of the extent of ambient exposure.

(1) *Evaluation of the Probability of Human Carcinogenicity.* Evaluation of the probability that a substance is a human carcinogen will be performed using criteria adopted by EPA for such determinations. These currently applicable criteria are summarized in the Interim Guidelines for Carcinogen Risk Assessment (41 FR 21404; May 25, 1976). Using these criteria, the weight and quality of evidence of human carcinogenicity for

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[10] A substance may also be regulated under section 112 due to its non-carcinogenic health effects, or due to a combination of carcinogenic and other serious effects. Non-carcinogenic effects of substances being reviewed as possible airborne carcinogens will also be evaluated and considered where information on these effects is available.

candidate substances will be assessed. Based on such assessments, including comparison with other substances which have been evaluated for regulatory action, a judgment of the probability that a substance is a human carcinogen for regulatory purposes will be made roughly as follows:

(a) High Probability of Human Carcinogenicity—Substances for which "best" or "substantial" evidence exists from epidemiological and/or at least one mammalian study.

(b) Moderate Probability of Human Carcinogenicity—Substances for which "suggestive" evidence exists from epidemiological, animal, or "short-term" studies.

(c) Low Probability of Human Carcinogenicity—Substances for which only "ancillary" evidence exists, such as from structural correlations, or for which epidemiological or animal results are judged to indicate low probability.

(2) *Preliminary Evaluation of Ambient Exposure.* EPA will also conduct preliminary evaluations to determine whether source emissions of high-probability carcinogens exist which cause or contribute to air pollution posing significant carcinogenic risks to the public. Among the factors that this evaluation may take into account are the number and types of sourses emitting the substances in areas where people may be exposed, the volume of their emissions, any ambient concentrations which may have been reported, and the number of people living near emitting sources or in the vicinity of ambient measurement sites. Where available, estimates of carcinogenic strength may be used to compute preliminary quantitative estimates of lifetime individual risks to the potentially most exposed individuals.

III. Initial Responses to Preliminary Assessment of Health Risks

A. Listing

Substances judged by the Administrator to present significant carcinogenic risks to the public will be listed under section 112 as hazardous air pollutants. A substance will be judged to present a significant carcinogenic risk if (1) it is judged by the Administrator to have a high probability of being a human carcinogen, and (2) there is evidence of significant public exposure via the ambient air from emissions from one or more categories of stationary sources. Where the available evidence is otherwise insufficient to indicate the existence of a significant risk, a high-probability carcinogen also will be listed under section 112 if a preliminary quantitative risk estimate suggests that a significant risk to the potentially most exposed groups exists. Where emissions or exposure data indicate the existence of a significant risk, quantitative risk estimates will not be considered evidence to the contrary.

B. Generic Standards

Upon the listing of a substance, previously-developed generic standards will be proposed for source categories of that substance to which they could apply. Generic standards, developed based on the similarities among industrial processes, will be "tailored" as necessary to fit the source categories for which they are proposed.

C. Moderate-Probability and Low-Probability Carcinogens

EPA will recommend or require further biological testing of substances initially judged to have a moderate or low-probability of being human carcinogens. Priorities for testing will be based on the extent of public exposure. Moderate-probability substances for which public exposures appear to be high will be considered for regulation under section 111 of the Clean Air Act.

D. Quantitative Risk Assessments

Quantitative risk assessments on all high-probability carcinogens will be performed, if possible. These assessments will be undertaken based on priorities designed to produce action most quickly on the most serious problems pending at any given time. The results of these assessments will be used in the assignment of priorities for further regulation and in the evaluation of residual risks.

(1) The risk assessments will examine:

(a) detailed information on emission sources of the pollutants, the sources' control status and total emissions, measured and predicted ambient concentrations of the pollutants, and the production levels and uses of the substances;

(b) distribution of the population around sources in specific sources categories;

(c) estimated duration and magnitude of exposures of the affected population and the most exposed individuals;

(d) estimated carcinogenic strength (potency) of the substances;

(e) estimated range of expected cancer incidence for the total population and individual risks for the most exposed individuals at various possible emission levels;

(f) other serious health effects of the substances; and

(g) projected population growth around existing sources.

(2) The criteria to be considered in assigning priorities for quantitative risk assessments include, in usual order of importance:

(a) probable extent of exposure of the public through air emissions;

(b) estimated carcinogenic strength;

(c) the effect of any generic standards proposed; and

(d) the feasibility of expeditious control.

(3) The results of detailed risk assessments and determinations resulting from the assessments will be published in the **Federal Register** and public comments will be solicited.

IV. Establishment and Review of Standards and Requirements

A. Source Categories Regulated

Emission standards in addition to generic standards will be proposed for any source category whose emissions present a significant risk to public health. Such standards and other requirements will be determined independently for each regulated source category. A source category emitting a listed pollutant will be found to pose a significant risk if there is evidence, from the detailed exposure analysis, that its emissions result in significant public exposure to the pollutant via the ambient air. Significant risk also will be found in the absence of such evidence, if a detailed risk assessment suggests that such a risk to the most exposed individuals or to the population exists. If emissions or exposure data indicate the existence of a significant risk, the quantitative risk assessment will not be considered as evidence to the contrary.

B. Priorities for Further Regulation

Further standards and requirements for regulated source categories will be developed according to the priority assigned to those source categories. Source categories will be assigned high, medium, or low priority based on the following criteria:

(1) magnitude of the total expected and upper bound cancer incidence associated with exposure to all carcinogens emitted by the source category;

(2) degree of risk to the most exposed individuals;

(3) ease of expeditious development and implementation of standards; and

(4) feasibility of significant improvements in controls.

C. Regulatory Options Analysis

EPA will conduct a regulatory options analysis to support decisions on further required control measures.

(1) The analysis will identify technologically feasible control alternatives, their economic, energy, and environmental impacts, and, in the case of substitutes, the benefits of continued use of the substance or process.

(2) The analysis will also designate levels of control considered "best available technology" for new and for existing sources in a category. The control level designated "best available technology" may be different for new and existing facilities in a category.

(a) For new sources, "best available technology" is that technology which, in the judgment of the Administrator, is the most advanced level of controls adequately demonstrated, considering economic, energy, and environmental impacts.

(b) For existing sources, "best available technology" is that technology which, in the judgment of the Administrator, is the most advanced level of controls adequately demonstrated, considering economic, energy, environmental impacts, and the technological problems associated with retrofit.

D. Requirements for Existing Sources

(1) Existing sources in a regulated source category will be required, as a minimum, to limit their emissions to the levels corresponding to the use of "best available technology".

(2) Existing sources in a regulated source category also will be required to limit their emissions in whatever additional amount is necessary, in the Administrator's judgment, to eliminate unreasonable residual risks to public health associated with those emissions.

(3) The principal emphasis in determining the level of additional control required to

eliminate unreasonable residual risk from an existing source category will be on public health. Factors which may be considered in this judgment include:

(a) the range of total expected cancer incidence and other serious health effects in the existing and future populations exposed, for the anticipated operating life of existing sources in the category;

(b) the range of health risks to the most exposed individuals;

(c) readily identifiable benefits of the substance or activity producing the risk;

(d) the economic effects (expecially plant closures) of requiring additional control measures;

(e) the distribution of the benefits of the activity versus the distribution of its risks; and

(f) other possible health effects resulting from the increased use of substitutes.

E. Requirements for New (Including Modified) Sources

(1) Except as provided below, new sources in a regulated source category will be required to meet a presumptive national emission standard designed to preclude the existence of significant risks under projected worst case assumptions of plant size and emissions, surrounding population density and distribution, and meteorology.

(2) Any proposed new source which shows, in the certification process required by section 112(c)(1)(A), that it meets the requirements of the Risk Avoidance Criteria (described below) applicable to that source category will automatically be permitted to meet the applicable best available technology standard instead of the applicable presumptive national emission standard. The specific terms of Risk Avoidance Criteria will be prescribed separately for each source category.

The criteria will generally require that either:

(a)(1) Population density and distribution around the proposed site at the source's proposed emission rate are within limits specified by EPA, and

(2) The proposed source is not within a specified distance of a source of carcinogens regulated under section 112; or

(b) An offset against new emissions can be obtained either internally (existing sources seeking to expand) or from existing sources of carcinogens regulated under section 112 within a specified distance.

(3) Any proposed new source which is unable to qualify for the automatic waiver to best available technology described in paragraph (2) may apply for the establishment of an alternative standard applicable to the proposed source as part of the certification process required under section 112(c)(1)(A). The Administrator will establish an alternative standard for that source at the best available technology standard or at whatever more stringent level of control is necessary, in his/her judgment, to prevent the existence of an unreasonable residual risk associated with emissions from the proposed source. Factors which may be considered in this judgment include:

(a) the range of total expected cancer incidence and other serious health effects associated with emissions of the source throughout its anticipated operating life;

(b) the range of health risks to the most exposed individuals from the source's emissions;

(c) existing risks to the affected population from emissions of the listed pollutant and other carcinogenic air pollutants;

(d) readily identifiable benefits of the substance or the activity producing the risk;

(e) the economic and technological feasibility of control measures more stringent than BAT;

(f) the distribution of the benefits of the activity versus the distribution of its risks;

(g) other possible health effects resulting from the use of substitutes for the substance or activity; and

(h) the extent to which possible emission offsets have been obtained.

F. Review of Standards and Requirements

Regulations promulgated for each source category of airborne carcinogens will be reviewed and, if appropriate, revised at intervals of no more than five years.

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[Note.—This Supplemental Statement will not appear in the Code of Federal Regulations.]

Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer

Supplemental Statement of Basis and Purpose

This document is intended as an elaboration of three aspects of the basis and purpose of EPA's proposed rule for the regulation of airborne carcinogens. It should be read in conjunction with the preamble to the Notice of Proposed Rulemaking for this action, which it supplements. The three aspects of the background of the proposal which are discussed in this supplement are: (1) a comparison of the EPA proposal with recent proposals of other Federal agencies for regulating carcinogens; (2) various regulatory approaches considered by the Administrator in formulating the proposed rule; and (3) a fuller explanation of the underlying view of the meaning and intent of section 112 of the Clean Air Act which led the Administrator to choose the standard-setting approach actually proposed.

I. Comparison With Other Proposals

The policies and regulatory approaches reflected in EPA's proposed rule are similar in many important respects to those contained in recent proposals by the Occupational Safety and Health Administration (OSHA) (*1*) and the Consumer Product Safety Commission (CPSC) (*2*). There are also a number of similarities to proposals made to EPA and other agencies by the Environmental Defense Fund (EDF) (*3*) and to some extent by the American Industrial Health Council (AIHC) (*4*). The most important similarities and differences among the various proposals are described below.

The critical areas for comparison of the various proposals are: (1) the scientific criteria underlying determinations of carcinogenicity for regulatory purposes; (2) the use of those criteria in automatic classification systems; (3) the regulatory response to determinations of carcinogenicity; and (4) the role of quantitative risk assessments.

A. Carcinogenicity Criteria

The scientific criteria for determination of carcinogenicity under the OSHA, CPSC, and EDF proposals are similar to the EPA Interim Guideline for Carcinogen Risk Assessment (*5*). All accept epidemiology as best evidence but presume human cancer risk as a result of animal data alone. All accept the principle that there is no safe level of exposure to carcinogenic substances. Differences between the EPA and OSHA criteria are discussed in some detail in the EPA testimony at the OSHA hearing. The major difference is that EPA may consider the results of a single well-conducted animal study as sufficient to classify a substance a high probability carcinogen, while the OSHA proposal requires replication of such a study or a second "postive" study in a different species. EPA feels that such a requirement is scientifically unnecessary where the original study is of sufficient quality and could result in unnecessarily long delays while retesting takes place.

Although the general scientific principles are similar, the OSHA and CPSC statements are considerably more specific on a number of points than are the EPA guidelines. EPA believes that greater specificity and agreement among the agencies are desirable, where possible, and has joined with the Occupational Safety and Health Administration (OSHA), Consumer Product Safety Commission (CPSC), Food and Drug Administration (FDA), and Food Safety and Quality Service (FSQS) in the Interagency Regulatory Liaison Group (IRLG) for the purpose of developing a uniform scientific basis for determining the probability that a substance is carcinogenic. The IRLG has recently published a document dealing with these issues (*6*). Once the document becomes final, the rule proposed today will be amended if necessary and those principles will be used by EPA in regulating airborne carcinogens under section 112.

There are a number of differences between the methods recommended by AIHC for carcinogenicity determinations and EPA's Interim Guideline. In particular, AIHC suggests that greater weight be given to negative epidemiological studies; that single-species animal studies are insufficient to make a presumption of human carcinogenicity; and that short-term test results are unsuitable for use in regulatory decisions.

EPA feels that while "negative" epidemiological evidence can sometimes provide upper bounds on possible risks, epidemiology is normally not a sensitive enough tool to provide proof that a substance which is carcinogenic in animals is not carcinogenic in humans. EPA considers well-conducted single species tests and single tests results substantial evidence of carcinogenicity. Such tests are widely used in industry and government laboratories. In light of the available evidence, delaying the implementation of controls for three or more years while confirmatory tests are conducted would not be a prudent policy. The Agency feels that existing experience with short-term tests is sufficient to suggest including results along with other evidence in deciding the likelihood of carcinogenicity. In summary, EPA feels that, given the available scientific evidence, protection of public health requires the use of the criteria outlined in the Interim Guideline.

The AIHC also recommends establishment of a nine-member panel to evaluate and classify carcinogens for all Federal agencies, suggesting that identification and classification of carcinogens is too important and too complicated to be left to government regulators alone. EPA believes, however, that there would be little advantage to this approach. Agreement among the IRLG agencies should make it unlikely that these Federal agencies would reach inconsistent conclusions about a substance's carcinogenicity. Having a single group—whether it be one agency or an outside group of scientists—perform these evaluations would only add another layer of review, which could create serious problems. Among other things, establishing priorities that would accomodate the needs of all affected agencies with their many different regulatory responsibilities and deadlines would be complex and resource-intensive. In addition, if an outside group of scientists were used to evaluate cancer risks, the scientists might be reluctant to take positions on substances for which data are not definitive. This would conflict with the agencies' obligation to act upon the best available information rather than to await definitive evidence. Finally, it should also be noted that current EPA procedures include an evaluation of carcinogenicity determinations and risk assessments by the EPA Science Advisory Board, a review panel consisting of scientists from outside of the Federal government.

The AIHC makes no clear recommendation on techniques to be used in evaluating excess cancer incidence other than to recommend that carcinogen strength and cancer risks be evaluated as part of the regulatory process. As EPA's proposal indicates, the Agency agrees that carcinogenic strength and risk should play a role in that process.

B. Classification Systems

In testimony at the OSHA hearings, EPA articulated its reservations about the use of rigid, fixed criteria and automatic classification schemes. EPA is concerned that, since each determination is to some extent unique, rigid classification schemes may not provide enough room for the use of informed scientific judgment in making carcinogenicity determinations. Examples of the Agency's concerns are discussed in the EPA testimony (*7*). EPA, therefore, prefers to continue to use a "weight of evidence" approach which allows the use of informed scientific and policy judgments in evaluating test results.

C. Response to Determinations of Carcinogenicity

Under the policy proposed by OSHA (upon which the EDF petition is modeled), substances classified as "confirmed carcinogens" would be automatically regulated through an immediate emergency temporary standard including exposure limits, monitoring, and work practices. Within six months, a permanent standard would be proposed to: (1) effectively ban the substance if a suitable substitute were available and (2) require exposures to be reduced to lowest feasible level through technological means.

The approach published by the CPSC establishes procedures for identification and classification of carcinogens based on scientific criteria and categories similar to those proposed by OSHA. A major difference between the CPSC and OSHA approaches is that if a substance is identified as a confirmed carcinogen ("Category A"), CPSC would not automatically propose a particular regulatory action. Instead action would be taken on a case-by-case basis, after a study of relevant factors.

EPA believes that the appropriate regulatory response following the listing of an airborne carcinogen under section 112 must take into consideration more than a determination of carcinogenicity. Given the large number of potential airborne carcinogens, some means of establishing priorities for regulating those substances posing the greatest public health risks is necessary to ensure that available Agency resources are used to the greatest effect. The set of initial regulatory responses in the proposed EPA rule is designed to accomplish that by accelerating the process of listing and initial regulation, and by enabling the Agency to address the most significant sources and substances first.

The CPSC policy also recognizes the need for such procedures. The system for setting priorities for assessment proposed by EPA is conceptually similar to that adopted by CPSC for establishing priorities for staff evaluation and Commission appraisal of consumer products containing carcinogens.

The OSHA and EDF proposals do not contain explicit procedures for the establishment of priorities after carcinogenicity determinations. Those proposals would entail a fairly rigid schedule of regulatory responses to notification or discovery of potential carcinogenicity. After carcinogenicity determinations, both the OSHA and EDF schemes would require automatic responses without explicit consideration of risks or other indices of relative priority.

One element of the OSHA proposal is the immediate imposition of an emergency temporary standard. The response is somewhat analogous to the "generic standards" element of today's proposal. Like OSHA, EPA believes that there is no reason to permit the continued exposure to risks which could be prevented by the use of clearly feasible control measures. EPA views the implementation of such measures as a high priority matter, especially since the application of pre-existing generic standards to specific sources will not divert significant Agency resources from other control efforts.

EPA also believes, however, that a system for establishing priorities for further regulatory actions is necessary in effectively implementing section 112. The Agency does not believe that a full system of automatic responses, such as that proposed by OSHA, would be feasible for use under section 112, both because of the large number of airborne carcinogens likely to be encountered and because of the differences in the statutory and practical tasks EPA must perform.

D. Role of Quantitative Risk Assessment

It is not celar what role, if any, quantitative risk estimates would play in the approach OSHA intends to employ. As noted earlier, EPA believes that, while cancer risk estimation is an imprecise endeavor involving many uncertainties, such estimation can provide a rough measure of the magnitude of carcinogenic risk posed by a substance. EPA believes that consideration of such estimates in establishing regulatory priorities and in determining the degree of additional control required beyond BAT is both useful and appropriate under section 112. This is particularly true in the Administrator's view with respect to exposures to carcinogens in the ambient environment, which, in contrast to occupational exposures, can often be very low and involve large populations. Like OSHA, however, EPA does not view these estimates as required for the decision that a particular substance being emitted into the air should be regulated as a hazardous pollutant, once a determination of probable carcinogenicity and significant exposure has been made.

II. Various Regulatory Approaches Considered

A central issue in developing a policy for the protection of public health from carcinogens is the determination of the extent to which exposures must be reduced. Given the impossibility of identifying levels of carcinogens with no associated risk, some have argued that no exposure should be tolerated and that emissions should be reduced as expeditiously as practical to zero. Others contend, on the contrary, that permissible exposures should be determined by an unstructured balancing of risks, costs, and benefits.

A number of approaches for addressing this problem have been considered or proposed by the Federal regulatory agencies, industrial groups, environmental organizations, and others. Prominent examples include the OSHA proposal 1, the CPSC policy (*2*), and the EDF petition (*3*) on airborne carcinogens. This section discusses various suggested possibilities that have been considered by EPA, as well as the approach proposed today.

The possibile approaches and schemes suggested fall into essentially four groups: zero-oriented approaches; predetermined decision rules; special approaches for new sources; and judgmental approaches. The charcteristics of these approaches are discussed below in terms of their possible usefulness in regulating carcinogens under section 112 of the Clean Air Act.

A. Zero-Oriented Approaches

As discussed above, the lack of identifiable health effects exposure thresholds for carcinogens suggests that exposure to even minute amounts of such substances poses some finite risk, and that repeated exposures increase the risk. This has led to the proposition that for public health purposes, no level of exposure to carcinogens can be considered absolutely "safe." In particular, because section 112 emission standards must protect the public health with an ample margin of safety, it has been argued that those standards must therefore eliminate risk completely.

The Administrator believes that his goal in administering section 112 must be to reduce exposures to carcinogens to the maximum extent possible. While this implies at least a theoretical goal of zero emissions of these substances, the immediate imposition of zero-emission requirements would lead to the closing of most facilities now emitting carcinogenic air pollutants. It is not now physically possible, for example, to manufacture, handle, and store volatile organic compounds without some emissions, however small.

As noted earlier, the Administrator does not believe that the immediate imposition of zero-emission standards on a general basis, with their attendant consequences, is appropriate under section 112. Nevertheless, in setting section 112 emission standards, public health considerations must be paramount. Various mechanisms designed to minimize risk as part of certain zero-oriented approaches may therefore be useful for purposes of section 112. These mechanisms include:

(1) *Immediate Emission Control Requirements Beyond the use of Best Available Technology.* Standards more restrictive than those achievable through the use of "best available technology" for existing sources, effective within between ninety days and two years of promulgation, could result in the closure of some sources.[11] Depending on the degree of additional control judged necessary, and on particular economic and technological factors, this could range from a few older, marginal facilities to industry closure. Such requirement may be appropriate where large residual risks remain after the use of best available controls.

(2) *Phased Control Requirements.* Although standards requiring controls beyond "best available" might not be immediately feasible for certain affected emission sources, such controls might be feasible if sufficient lead time were available before their required achievement. A form of phased control requirements, designed to force technology improvements, is suggested by EDF in its petition. This approach would involve establishing a predetermined schedule for periodic tightening of emission standards, leading ultimately to zero emissions. EPA

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[11] The meaning of the term "best available technology" as used here, is explained in the principal text accompanying the proposed rule.

does not regard this particular form of phased control as well-suited for use under section 112, primarily because it fails to provide for consideration of the consequences of a zero-emissions requirement in differing circumstances, and because it could prove legally and practically infeasible for the Agency to implement.

The concept of technology forcing phased control has, however, been used in achieving ambient air standards and reducing automotive emissions, and may be employed on a more selective basis under the proposed rule. Such requirements might entail somewhat accelerated closure of older, poorly controlled plants, allowing time for funding and construction of better controlled facilities and the development of improved control technology. This approach could result in reduction of risks without extensive economic dislocation or loss of the benefits associated with the activity or substance involved.

(3) *Required Use of Substitutes.* The availability of safe and adequate substitutes for particular substances or uses can be an important factor in determining the degree of control required for a given source category. It has been suggested, in fact, that in order to eliminate emissions of the carcinogenic substance the use of substitutes should be required whenever they exist.

The main difficulty with this approach is that while partial or full substitutes are often available, their consequences vary greatly. In many cases, for example, requiring the use of substitutes can result in prohibitive economic penalties. Substitutes available for some applications are also often inadequate for other applications. Moreover, the potential health effects associated with substitutes will often be unknown. Since adequate substitutes are often similar to the originial substances, they may therefore pose risks which could approach or exceed those of the banned substances.

In addition, because carcinogens can be emitted in varying amounts from such diverse sources as fireplaces, chemical plants, automobiles, dry cleaning establishments, steel manufacturing, and natural chemical and radioactive emission sources elimination of carcinogenic risks through substitution for all these activities is clearly impractical. Substitutes cannot therefore be realistically considered a solution for all or even most airborne carcinogen problems.

In establishing control requirements under section 112, consequently, EPA would consider measures requiring the use of substitutes. In reaching a decision, however, the Agency will also weigh the factors noted above to ensure that the net effect of such requirements is consistent with the other aspects of the proposed rule.

B. Predetermined Decision Rules

A number of approaches, rejecting the zero risk concept, suggest that the appropriate degree of control can be determined through uniform decision rules, applied irrespective of individual circumstances. While such decision rules vary widely in their relative emphasis on factors such as risk, cost, benefits, and technology, they share the central premise that regulatory consistency can be achieved by prescribing in advance the weight to be assigned to each of these factors under all circumstances.

Although regulatory consistency is desirable, decisions made according to predetermined rules are often unable to account adequately for unforeseen or varying circumstances. Because of the difficulty in anticipating all possible combinations of the relevant factors, decisions bound by such rules will frequently fail to produce desirable regulatory results.

EPA feels that while it is important to articulate the way in which relevant factors will be considered and weighed in determining control requirements for airborne carcinogens, the complexity and unpredictability of the situations that may arise dictate that some flexibility be maintained. Predetermined decision rules will therefore not form the principal basis for determining control requirements for airborne carcinogens under section 112. Nevertheless, some elements of decision rule approaches may be useful as benchmarks or guidelines. These approaches are discussed below.

(1) *Specification of a Fixed Target Carcinogenic Risk or Incidence Level.* This approach involves the selection of a target level of cancer risk or incidence for purposes of regulatory action, and is based on the use of quantitative risk assessment techniques. Under this approach, a fixed numerical risk or expected cancer incidence rate target would be used in determining the degree of control required for carcinogens.

The use of target risk levels does have some precedent as a basis for regulatory decisions. The FDA, for example, has regarded an upper bound lifetime cancer incidence rate of less than one per million people exposed to carcinogenic residues in certain foods as "virtually safe". EPA could theoretically establish a similar goal for airborne carcinogens for use under section 112. If the predicted risk or incidence were higher then the target, the degree of control required would be that needed to reach the goal.

While this approach might be consistent with the requirement that section 112 standards place primary emphasis on protection of public health, it suffers from two drawbacks. First, although current quantitative risk assessment techniques for chemical carcinogens are useful decisionmaking tools, considerable uncertainties are associated with the techniques at their current stage of development. Consequently, the Administrator believes that in using quantitative risk assessments, he should generally be free to consider the varying degrees of uncertainty that actual cancer risks may be significantly above or below those predicted by the estimation procedures, and not be bound by a fixed target.

Second, a fixed target risk level, used as the determinant of emissions standards, would also inadequately account for the varying conditions characteristic of air pollution. The suggested use of target risk levels instead of a zero-risk requirement is based on the importance of considering the various consequences of incremental risk reductions to levels approaching zero, and it would be inconsistent with this basis to use a fixed target risk level, irrespective of these varying consequences, in setting standards. These consequences differ greatly among source categories of air pollutants, and a fixed target fails to provide the flexibility necessary for an appropriate response. Where risks could be reduced beyond the target without significant costs, for example, that should be permitted. Likewise, where attainment of the goal would eliminate a highly beneficial activity, the decision-maker should be able to consider less stringent standards.

(2) *"Cost-Per-Life" Goals.* Some have suggested that "acceptable" standards for carcinogens may be developed by striking a predetermined balance of health risks, human lives, economics, and social benefits. Fundamental to this approach is the expression of all these factors in economic terms and the adoption of a cost-per-life-saved goal. Under this decision rule scheme, regulations would require control to, but not beyond, the point where the incremental costs associated with saving an additional life were equivalent to the goal. Proponents of this approach argue that it would result in a more optimal allocation of national resources.

The Administrator believes that several aspects of this approach render it unsuitable for standard-setting under section 112. One such aspect is the basic assumption that it is appropriate to assign a single monetary value to human life. The Administrator regards that task as neither practical nor ethically acceptable. It is impractical because no consensus criteria exist which can be used to establish that cost value. Indeed, the internalized and external expenditures for protection of human lives in American society ranges across a vast spectrum, and the very existence of this spectrum is persuasive evidence that the society places heavy emphasis on the surrounding circumstances in "assigning" health protection values. The approach is also unacceptable in that it fails to consider the balance of equities between those benefiting from the activity creating the risk and those who may die as a consequence of the activity. Finally, the fixed-cost approach also necessarily ascribes more certainty to the risk assessment and cost estimates underlying its use than is justifiable, in view of the uncertainties present in both sets of estimates. Therefore, although cost-per-life estimates may be used for perspective in considering control options, they will not be used as decision rules in setting standards under section 112.

(3) *"Best Technology".* Requirements for "best" control technology for emission sources have been advocated as an interim or ultimate approach which can be used without difficult considerations of economics in determining the degree of control required. Although such a technology-based approach at first appears relatively simple to implement, it is soon apparent that "best available technology" cannot be defined by technical considerations alone. For example, if an "add-on" control device achieves 90% control, then the installation of an additional unit of similar capabilities could reduce

remaining emissions by an additional 90%. Still further units could always be applied to marginally reduce emissions. Clearly, at some point in this process the costs associated with marginal increases in control would be grossly disproportionate to the incremental reductions in emissions. Thus, "best available technology" must be defined with at least some reference to economic considerations, as in the case of new source performance standards under section 111 of the Clean Air Act.

"Best available technology" as defined in section 111 of the Clean Air Act may not be an adequate level of control for purposes of section 112, however, since "best available technology" does not consider the health risks remaining after its use. While "best available technology" may prove a useful starting point, therefore, it is not itself sufficient for section 112 purposes without consideration of the residual health effects.

C. Special Approaches for New Sources

A number of approaches and mechanisms have been suggested to contain or minimize increases in risks which may be associated with operation of new sources of carcinogenic air pollutants. It has been argued that special requirements for new sources are both necessary and justified because (1) given existing uncertainties about the health effects associated with exposures to various levels of carcinogens, those exposures should be limited as much as possible, and (2) new sources can reasonably consider control and risk avoidance options not readily available for existing sources. Several mechanisms for treatment of new sources are discussed below.

(1) *Stricter Standards for New Sources.* This approach would specify control requirements for new sources that are more stringent than those for existing sources. In effect, this is simply a modification of the best technology approach discussed above. The approach does have the advantage of limiting emissions from new facilities to a greater degree than from existing facilities under a best technology standard, and in that sense can be said to contain the risk somewhat.

The approach could also involve consideration of residual risks associated with projected typical new source siting conditions. However, because it cannot consider the residual health risks associated with all of the varying sets of population distributions in which a new source might actually be located, the approach may not provide sufficient protection under actual conditions. Thus, like the best technology approach for existing sources, this approach can serve as a useful starting point, but is not sufficient alone.

(2) *Regional Emissions Offsets.* An "offset" policy would require a reduction in emissions of a given carcinogenic air pollutant from existing sources in an area as a precondition for construction of new sources within a specified distance of the existing sources. To the extent that new sources desire to locate near existing facilities, development of improved emissions control technology would be encouraged by this approach and increases in risk to health beyond existing levels would be prevented.

The disadvantages of this approach as a general policy are that it would have no effect at all on the establishment of sources at new locations, and could prevent the expansion of sources which have already installed advanced technology or do not present significant new risks. In short, it employs the somewhat arbitrary assumption that any increased risk in an area with existing sources is not tolerable, but that increased risks in areas with no existing sources are permissible.

(3) *National Emissions Freeze.* Under this option, additional emissions from new or modified sources would be prohibited except to the extent that offsets are obtained from existing sources on a nationwide basis. This approach would account for some of the disadvantages of the regional emissions offset approach. It also provides incentives for technology-forcing and containment of risk.

The main drawbacks of the approach are that it presumes that any additional emissions create an intolerable risk, and that it would fall the most heavily on the newest industries (those with the fewest existing sources) and on those which have already forced technology the most. It also fails to provide incentives for careful siting of new sources.

(4) *Case-by-Case Review of New Sources.* Under this approach, additional emissions in populated or high risk areas would be permitted only after consideration of residual risks and other relevant factors associated with each new source proposed. In this review, special emphasis would be placed on appropriate siting and the use of improved control measures.

By evaluating risks, benefits, controls, and siting on a case-by-case basis, this approach could significantly limit risk without arbitrariness and over-regulation problems of either regional or nationwide offset requirements. Yet by requiring individual reviews, the pressure is maintained for both careful siting of new sources and improving technology where that appears necessary.

D. Judgmental Approaches

In contrast to the zero-oriented and fixed, decision rule approaches outlined above, "judgmental" approaches posit that the degree of control which is appropriate for airborne carcinogens cannot be predetermined in the abstract for all cases and, to some extent, depends on the particular circumstances. Circumstantial factors which might be considered, in addition to the risk to public health, include the costs of further control, the benefits of the activity, the distribution of risk versus benefits, and the availability of substitutes.

The use of a judgmental approach appears desirable to the Administrator because it permits him to take advantage of the strong points of various available approaches without suffering their drawbacks. The specific approach chosen, however, must be compatible with the mandate of section 112 to put principal emphasis on public health protection, and each of the factors involved must be assigned a weight consistent with this principle.

Although protection of public health must be paramount, the relative importance of other factors can vary. Society may be willing to pay more for control or accept higher health risks associated with activities viewed as important or essential. The distributional aspects of control situations can differ even when the magnitude of risk, costs, and benefits are similar. Moreover, differing degrees of certainty in the cancer incidence, economic, and benefits estimates can call for different regulatory responses. Given this variety of circumstances and the frequent uncertainty of analyses, the Administrator believes that it is important to consider different situations on their own merits.

Judgmental approaches obviously place great responsibility on decisionmakers to weigh the relevant factors carefully and to reach judgments in the best interest of the public. The Administrator believes that such responsibility, while heavy, is unavoidable if protection of public health is to be maximized within the constraints of a world of finite resources. The policy contained in the proposed rule is based on these views.

III. Legal Basis for the Proposed EPA Approach

A. Congressonal Intent and the Characteristics of Airborne Carcinogen

The main question the Administrator has found it necessary to answer in arriving at the interpretation of section 112 reflected in today's proposal is whether Congress, in enacting that section, had any specific intent about how an ample margin of safety would be derived in setting standards for air pollutants with the characteristics of carcinogens. If Congress had a specific intent, that would of course be conclusive. If, on the other hand, the situation presented by regulation of airborne carcinogens under section 112 falls in the interstices of congressional intent, the Administrator is required by established legal principles to deduce and impute an intent in a reasonable way that is consistent with the overall purposes and scheme of the statues.[12]

(1) The focus of congressional attention: "threshold" pollutants. In answering this question, the Adminstrator has found it helpful to recall the pollution problem that Congress perceived and addressed in 1970, when section 112 was enacted as part of a major revision of the entire Act. The legislative history of the Clean Air Amendments of 1970 reveals that the attention of Congress was at that time fixed primarily on the two problems perceived to be at the heart of the air pollution crisis: stationary source emissions of various widely prevalent pollutants such as sulfur dioxide, particulate matter, and photochemical oxidants; and automotive emissions of some of the same pollutants. The statutory scheme constructed for dealing with these pollutants reflected congressional recognition of the view that the pollutants have exposure thresholds for adverse health effects; that is, levels below which exposure to the pollutants

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[12] See, e.g., *Mourning* v. *Family Publications Serv., Inc.*, 411 U.S. 356, 371–373 (1973); *Morton* v. *Ruiz*, 415 U.S. 199, 231 (1974); *United States* v. *Southwestern Cable Co.*, 392 U.S. 157, 171–173 (1968); *International Harvester Co.* v. *Ruckelshaus*, 478 F.2d 615, 648 (D.C. Cir., 1973).

would not be expected to result in adverse health effects[13]

Because it is seldom scientifically feasible to identify precisely the levels at which thresholds occur, the location of a threshold must be estimated somewhere below the exposure level (the "demonstrated effects level") at which adverse health effects have been found to occur in empirical research. Congress therefore required in section 109 of the Act that "margins of safety" be established to protect against unknown dangers below the demonstrated effects levels.[14] The Administrator believes that Congress intended health effects to be the only consideration in setting standards under section 109 under these circumstances, and this view has governed the establishment of national ambient air quality standards (NAAQS) under section 109 to date.[15]

Congress also incorporated the "margin of safety" concept, used in section 109 in dealing with the widespread apparent threshold pollutants that were at the forefront of its awareness into the requirements of section 112. The Administrator believes that this incorporation reflects both a parallel intent and parallel assumptions. Thus section 112 standards set to protect against adverse health effects characterized by a threshold must also be based solely on health,[16] with an "ample" rather than an "adequate" margin of safety to account for the greater severity of the pollutants involved.[17] The apparent underlying congressional assumption, however—the existence of thresholds—also leads the Administrator to believe, in the absence of significant contrary indications, that Congress did not specifically foresee or address the problems inherent in applying the margin of safety concept to air pollutants under fundamentally different circumstances.

(2) The carcinogen problem: no apparent thresholds. Regulation airborne carcinogens under section 112 does require the application of the margin of safety concept under fundamentally different circumstances. Although carcinogens, as air pollutants which may cause an increase in mortality, are clearly among the pollutants that the Administrator is required to regulate under section 112 of the Act, carcinogens must also (for the reasons discussed earlier) be regarded for public health purposes as having no identifiable adverse health effects thresholds. The method used to establish a margin of safety for a threshold pollutant—setting the standard somewhere below the demonstrated effects level at a point at which the absence of adverse health effects is predicted—therefore cannot be used to set standards (other than at zero) for carcinogens under section 112, since risk of cancer is believed to exist at any exposure level greater than zero.

In establishing margins of safety for carcinogens, therefore, the task is to determine how low the risk of the occurrence of cancer in an exposed persons or the projected incidence in an exposed population must be driven before a margin of safety can be considered ample to protect the public health. Only two approaches are available for performing this task: either the emission standards must be set at zero to eliminate the risk of cancer incidence altogether, or some residual risk must be permitted. Because Congress did not give specific consideration to this problem, the Administrator does not believe that section 112 expresses an intent to eliminate totally all risks from emissions of airborne carcinogens.[18] Section 112 standards which permit small residual risks can, in the Administrator's judgment, therefore provide an ample margin of safety to protect the public health.

(3) *The consequences of a zero-risk requirement.* This view is based on several additional factors. Foremost among these is the belief that if Congress had intended the drastic results that would flow from a requirement to eliminate all risk from emissions of carcinogens, it would have spoken with much greater clarity.[19]

A requirement that the risk from atmospheric carcinogen emissions be reduced to zero would produce massive social dislocations, given the pervasiveness of at least minimal levels of carcinogenic emissions in key American industries. Since few such industries could soon operate in compliance with zero-emission standards, closure would be the only legal alternative. Among the important activities affected would be the generation of electricity from either coal-burning or nuclear energy; the manufacturing of steel; the mining, smelting, or refining of virtually any mineral (*e.g.*, copper, iron, lead, zinc, and limestone); the maufacture of synthetic organic chenicals; and the refining, storage, or dispensing of any petroleum product.[20] That Congress had no clear intention of mandating such results seems self-evident.

The conclusion that Congress did not contemplate closure of the nation's basic industries, or even widespread industry closures, is also supported by the history and language of section 112. First, Congress in 1970 gave the subject of plant closures only brief consideration in connection with section 112.[21] While the legislative history makes clear that the Administrator is empowered to set standards under section 112 that result in plant or industry closures where appropriate,[22] it is by no means clear that Congress intended that result for all non-threshold hazardous pollutants, or even that Congress really focused on the problem.[23] Indeed, the very limited nature of the legislative history itself compels the conclusion that closure of the nation's basic industries, irrespective of the actual levels of risk involved, could not have been contemplated. That conclusion becomes even more inescapable in light of the 1977 Amendments, which added radioactive substances—long regarded as confirmed carcinogens and emitted from a wide variety of sources—to the coverage of the Act, with no mention anywhere of industry closures as the inevitable consequence.

The language of section 112 is also consistent with today's proposal. In using the phrase "margin of safety," Congress was borrowing a concept from the field of enginering,[24] where it had previously employed the term.[25] By prescribing the use of a margin of safety for the load factors of underground mine hoist cables in the 1969 Mine Safety Act, for example, Congress surely did not intend to suggest that the safety factor must guarantee a failure risk of zero. Indeed, no reputable engineer would say that even with a margin of safety an "adequately strong" hoist cable[26] presents a failure risk of absolutely zero.

Nor does the use of the term "safety" necessarily imply a zero-risk concept. Where Congress has intended to require safety from the risk of cancer to be absolute, it has known how to express that intention clearly, as it did in the Delaney Clause of the Food and Drug Act,[27] prohibiting the use of any food additive found to induce cancer in man or animal at any level of exposure. This provision was enacted years before section

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[13] Some physiological responses (not producing adverse health effects) may occur at exposure levels below the thresholds.

[14] S. Rep. No. 91–1196, 91st Cong., 2d Sess., at 9–10 (1970).

[15] *See, e.g.*, 44 FR 8202 (February 8, 1979) (revisions of ozone standard). Although Congress has precluded consideration of the feasibility of attaining NAAQS in the standard-setting process, it has provided various means for feasilbilty factors to be considered in connection with control of the pollutants described in section 108. Control of pollutants listed under section 108 can take account of feasibility through opportunities for allocation of the burdens of control by the states under section 110, through delays in compliance under sections 113(d) and 110, and through attainment date extensions under section 110(e). Under section 111(d) of the Act, feasibility is taken into account directly in connection with control of certain similar, but less ubiquitous, pollutants emitted by discrete source categories.

[16] This view was recently endorsed in *Hercules, Inc.* v. *EPA*, F.2d——, 12 ERC 1376 (D.C. Cir., 1978).

[17] This construction of the difference between "adequate" and "ample" was recently expressed by the U.S. Court of Appeals for the District of Columbia circuit in *EDF(PCBs)* v. *EPA*.——F.2d——, 12 ERC 1353 (1978).

[18] While Congress apparently believed that some substances might be so toxic that any level of emissons should be prohibited (*see, e.g., A Legislative History of the Clean Air Amendments of 1970*, U.S. Government Printing Office, 1974, at 227) (Statement of Senator Muskie), it seems to have had in mind sustances so poisonous that essentially any ambient concentration would be expected to produce widespread serious health effects, rather than substances with the characteristics of carcinogens, which would produce only scattered, random health effects at very low concentrations.

[19] *Cf. Brown* v. *EPA*, 521 F. 2d 827, 834 (9th Cir., 1975), *vacated on other grounds*, 431 U.S. 99 (1977), opinion on remand, 566 F. 2d 665 (1977).

[20] One widespread, though non-industrial, activity that would also be affected is the buring of wood in home fireplaces.

[21] *See, e.g., Legis. Hist., supra,* at 133 (statement of Senator Muskie).

[22] *See, Legis. Hist., supra,* at 133 (statement of Senator Muskie); *Adamo Wrecking Co.* v. *U.S.*, 434 U.S. 275, 54 L. Ed. 2d 538, 555 (Stevens, J., dissenting).

[23] In fact, the congressional expectation in 1970 was apparently that only a few pollutants would untimately be found "hazardous" within the meaning of what became section 112. See, S. Rep. No. 91–1196, *supra*, at 20.

[24] See *EDF* (*PCBs*) vs. *EPA*, *EPA*, *supra*, slip opin. at 40.

[25] Federal Coal Mine Health and Safety Act of 1969, 314(a), 30 U.S.C. § 874(a); *see also* 30 CFR 75.1401–1 (1977).

[26] 30 U.S.C. 874(a).

[27] 21 U.S.C. 348(c)(3)(A).

112, and the absence of comparable specificity in section 112 suggests that "an ample margin of safety to protect the public health" need not be interpreted as requiring the complete elimination of all risks.[28]

In interpreting the margin of safety concept in section 112 of the Clean Air Act, moreover, there is no reason to believe that Congress intended to make air pollution practically the sole facet of American life from which the government would attempt to eliminate risk entirely.

Not only is there no indication, as noted above, that Congress considered the inevitable consequences of such a decision, but such an interpretation would also be quite incongruous in view of the provisions of numerous other public health statutes enacted during or since 1970. These statutes deal with, among other things, environmental carcinogens to which people are equally or more exposed, and they all permit consideration of factors other than risk in setting standards or taking comparable actions.[29]

In particular, the recent enactment of the Toxic Substances Control Act, which was intended to address the problem of toxic substances comprehensively, supports the view that where Congress has specifically considered the problem of reducing risks posed by environmental exposure to carcinogens, it has not required complete elimination of those risks. Taken together, the Administrator believes that these statutes provide strong evidence that the complete elimination of risk from environmental exposure to carcinogens is not the task with which he has been charged by Congress.

B. *Ample margins of safety under section 112.* For reasons stated previously, the Administrator has concluded that section 112 does not require him to base all emission standards for carcinogens on a criterion of zero risk from exposure to such substances. Once that proposition is accepted, at least limited consideration of factors other than the level of risk itself is unavoidable, since some criteria are needed in order to judge whether or not the degree of public health protection associated with a particular standard is "ample."[30]

The Administrator believes that section 112 clearly requires this determination to be based primarily on risk. The Administrator also believes, however, that he may consider other social and economic factors in determining whether an ample margin of safety is provided by a given control level. These factors include the benefits of the activity or substance producing risk; the distribution of the benefits versus the distribution of the risks; the availability and possible environmental risks of substitutes for that substance or activity; and the cost of reducing the risks further.

The rule proposed today will provide an ample margin of safety in several ways, consistent with this view. First, it protects against the unknown dangers of low-level exposures to airborne carcinogens by treating them as pollutants presenting risks even at low exposure levels. Next, it places primary emphasis on risk in establishing standards for sources regulated under section 112, and therefore requires at a minimum that such sources use best available technology to reduce cancer risks from their emissions. Beyond that, additional control measures will be required to eliminate residual risks judged unreasonable in light of the factors noted above. If necessary, this could entail closure of a source or even an industry, although the Administrator is not now aware of any source category whose carcinogenic emissions would be likely to require industry closure.

The proposal would also carry out the public health mandate of section 112 in two additional ways: first, by quickly imposing generic standards where possible to eliminate swiftly certain existing sources of carcinogenic emissions; and second, by applying the unreasonable risk criterion to contain the risks posed by emissions from new sources. The Administrator believes that provisions dealing specifically with the otherwise unpredictable increases in risks posed by emissions from new sources are a necessary element of a policy under section 112 that requires the elimination of unreasonable residual risks. The Administrator also regards these provisions as consistent with, if not required by, the policy of the Act to afford maximum public health protection b preventing significant increases in exposure to pollutants regulated by the Act.[31]

Finally, since the issues posed by today's proposal have not yet been judicially resolved,[32] the Administrator regards the foregoing analysis of the requirements of section 112 as a valid exercise of his discretion to interpret the meaning of these complex provisions of the Act.[33] The interpretation of section 112 stated here is the first detailed analysis the Administrator has published of the application of the section to regulation of airborne carcinogens. It is, however, consistent with his initial (and subsequent) actions in regulating asbestos, the first substance regulated under section 112 in part for carcinogenic effects. In that initial rulemaking, despite the absence of a known threshold level for carcinogenic effects, the Administrator explicitly considered the technological and economic importance of certain uses of asbestos and decided that, although a certain "minimal risk to the public" would probably remain, emissions from certain of those activities should be allowed to continue.[34]

EPA also considered such factors in establishing emission standards for vinyl chloride, the only other substance for which emission standards have been set under section 112 to control carcinogenic effects. The interpretations of section 112 published in connection with that action are consistent with, though not as detailed as, the analysis appearing here.[35] Those interpretations were reiterated, and the health-based nature of section 112 emphasized, in a proposal to amend the vinyl chloride standards.[36] These publications make clear the Administrator's consistent view that section 112 requires him to focus principally on health risks in regulating airborne carcinogens, but that it does not require the elimination of all risks from carcinogens in establishing an ample margin of safety to protect the public health.

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2. Consumer Products Safety Commission, "Interim Policy and Procedure for Classifying, Evaluating, and Regulating Carcinogens in Consumer Products", 43 FR 25658, June 13, 1978. Withdrawn, 44 FR 23821, April 23, 1979.
3. "Petition for the Initiation of Rulemaking Proceedings to Establish a Policy Governing the Classification and Regulation of Carcinogenic Air Pollutants under the Clean Air Act," Environmental Defense Fund, November 7, 1977.
4. "Testimony on OSHA's Generic Carcinogen Proposal," American Industrial Health Council, New York.
5. EPA, "Health Risk and Economic Impact Assessments for Suspected Carcinogens', Interim Procedures and Guidelines, 41 FR 21402, May 25, 1976.
6. "Scientific Bases for Identification of Potential Carcinogens and Estimation of Risks" Report by the Work Group on Risk Assessment of the Interagency Regulatory Liaison Group (IRLG) 44 FR 39858, July 6, 1979.
7. EPA's Testimony on OSHA's Proposed Cancer Policy, presented at OSHA public hearings beginning May 16, 1978.

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[28] That Congress might have chosen an absolute safety rule for food additives, but not for air pollution, is quite plausible on policy grounds. *Cf.* Doniger, "Federal Regulations of Vinly Chloride," 4 *Ecology Law Quarterly* 497, at 656–658 (1978).

[29] *See*, Federal Insecticide, Fungicide and Rodenticide Act, as amended, 7 U.S.C. 136a *et seq.*; Toxic Substances Control Act, 15 U.S.C. 2601 *et seq.*; Safe Drinking Water Act, 42 U.S.C. 300f *et seq.*; Clean Water Act, as amended, 33 U.S.C. 1251 *et seq.*; and Occupational Safety and Health Act of 1970, 29 U.S.C. 651 *et seq.*

[30] As discussed above, this conclusion is of course limited to situations where standards cannot be set on the basis of an adverse health effects threshold. Where standards can be set on that basis under section 112, factors other than health effects need not and may not be considered.

[31] *See*, §§ 101(b)(2) and 160–169 of the Act, 42 U.S.C. 7401(b)(2) and 7470–7479, H.R. Rep. No. 95–294, 95th Cong., 1st Sess. at 103–178 (1977). The Administrator has previously expressed his view that new sources of carcinogen emissions should not be allowed to create significant new risks to exposed populations, 42 FR 28154, 28156 (June 2, 1977), and that new sources should be required to use improved emission control techniques, *id.* at 28155.

[32] The Administrator does not regard the *EDF(PCBs)* and *Hercules* cases noted above as controlling precedent for the interpretation expressed here. Neither of those cases involved regulations promulgated under section 112, and neither dealt with the primary question involved here, the regulation of carcinogens—nonthreshold pollutants—under the Clean Air Act.

[33] *See, e.g., Train* v. *NRDC*, 420 U.S. 60 (1975).

[34] *See* 38 FR 8820 (April 6, 1973).

[35] *See* 40 FR 59532, 59534, 59535–59538 (December 24, 1975); 41 FR 46560, 46561–46562 (October 21, 1976).

[36] *See* 42 FR 28154 (June 2, 1977).

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1562-2, Docket No. OAQPS 79-14]

Proposed Policy and Procedures for Indentifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer; Advance Notice of Proposed Generic Standards; Public Comment Period

AGENCY: Environmental Protection Agency.

ACTION: Notice of extension of public comment period.

SUMMARY: This notice extends the period for comment on proposed and procedures for identifying, assessing, and regulating carcinogens emitted into the ambient air from stationary sources. The comment period is extended from August 12, 1980 through the public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens, tentatively scheduled for early November, 1980. Notice of the date by which comments are due will accompany the announcement of the meeting date and location.

DATES: The public comment period on the proposed policy and ANPR will close following the public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens tentatively scheduled for early November, 1980.

ADDRESSES: All written comments on the proposed policy and ANPR should be addressed to: Central Docket Section, Gallery 3, West Tower, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. Attn.: OAQPS 79-14 (proposed policy) or A 79-13 (ANPR).

Information on which the proposed policy and ANPR are based as well as the written comments received and transcripts of the public hearings are available for public inspection and copying at the Central Docket Section.

FOR FURTHER INFORMATION CONTACT: Mr. Joseph Padgett, Telephone 919-541-5204 (FTS 629-5204).

SUPPLEMENTARY INFORMATION: On October 10, 1979, the Environmental Protection Agency proposed in the **Federal Register** (44 FR 58642) a policy and procedures for identifying, assessing, and regulating carcinogens emitted into the ambient air from stationary sources. In the same **Federal Register** (44 FR 58662), EPA published an advance notice of proposed rulemaking (ANPR), soliciting comments on draft generic work practice and operational standards for volatile organic compounds which could be applied quickly to reduce emissions of airborne carcinogens from certain source categories.

Interested individuals were invited to submit written comments on the proposed policy and ANPR by February 21, 1980. This was extended to April 14, 1980 and again to August 12, 1980 in order to afford additional opportunity for public comment.

Based on the written and oral comments received on the proposed policy, EPA has determined that further public discussion of certain major scientific issues is warranted. The format for this discussion will be a public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens tentatively scheduled for early November, 1980. Once the date for this meeting is determined, an announcement will be published in the **Federal Register**. The meeting announcement will include notice of the comment period deadline and the date of by which material rebutting, responding to, or supplementing written or oral comments submitted at the Science Advisory Board meeting must be submitted to EPA.

Dated: August 8, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 80-24810 Filed 8-12-80; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1710-3; Docket Nos. OAQPS 79-14 and A 79-13]

Proposed Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer; Public Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Closure of Public Comment Period.

SUMMARY: This notice announces closure of the period for public comments on the proposed airborne carcinogen policy and on the advance Notice of Proposed Generic Standards (ANPR) published concurrently by EPA October 10, 1979.

DATES: Comments on the proposed policy and ANPR should be postmarked no later than January 22, 1981.

ADDRESS: All written comments on the proposed policy and ANPR should be addressed to: Central Docket Section, Gallery 3, West Tower, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. ATTN: OAQPS 79-14 (proposed policy) or A 79-13 (ANPR).

Information on which the proposed policy and ANPR are based as well as the written comments received and transcripts of the public hearings are available for public inspection and copying at the Central Docket Section.

FOR FURTHER INFORMATION CONTACT: Mr. Bob Schell, Telephone 919-541-5345 (FTS: 629-5345).

SUPPLEMENTARY INFORMATION: On October 10, 1979, the Environmental Protection Agency proposed in the **Federal Register** (44 FR 58642) a policy and procedures for identifying, assessing and regulating carcinogens emitted into the ambient air from stationary sources. In the same **Federal Register** (44 FR 58662), EPA published an advance notice of proposed rulemaking (ANPR) soliciting comments on generic work practice and operational standards for volatile organic compounds which could be applied quickly to reduce emissions of airborne carcinogens from certain source categories.

EPA has extended the public comment period on the subject rulemakings several times (44 FR 70196, 45 FR 6960, 45 FR 25828, 45 FR 53842) to accommodate the requests of concerned individuals and organizations. The dockets for these rulemakings currently include more than 200 written submissions and the oral transcripts of three public hearings.

In the most recent **Federal Register** notice (45 FR 53842, August 13, 1980), the Agency announced an extension of the comment period to permit further consideration of certain scientific issues raised during the public hearings and in the written comments. The notice explained that the consideration of these issues would include a public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens tentatively scheduled for November 1980. The Subcommittee had been previously scheduled to meet September 4-5, 1980 to review EPA carcinogenicity and exposure assessments on several substances identified as possible candidates for regulation as airborne carcinogens. In the course of this review the Subcommittee was able to devote a considerable part of the meeting to a discussion of several basic scientific issues relevant to the proposed policy, including carcinogenicity evaluation and risk estimation. Based on the SAB's discussion of basic scientific issues in its September meeting, EPA has concluded that a further meeting of the SAB prior to finalization of the airborne carcinogen policy is unnecessary. For these reasons, the comment period will be closed thirty days after publication of this notice.

Dated: December 16, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 80-39766 Filed 12-22-80; 8:45 am]

ENVIRONMENTAL
PROTECTION
AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

GENERIC STANDARD

40 CFR Part 61

[FRL 1254-2]

National Emission Standards for Hazardous Air Pollutants; Advance Notice of Proposed Generic Standards

AGENCY: Environmental Protection Agency (EPA).

ACTION: Advance notice of proposed rulemaking.

SUMMARY: This notice sets forth draft generic standards that EPA may propose for sources of carcinogenic organic chemicals that are listed as hazardous air pollutants under section 112 of the Clean Air Act. Elsewhere in this issue of the **Federal Register** EPA is proposing a policy for the identification, assessment and regulation of airborne carcinogens under section 112. Under this policy, EPA would employ generic standards where applicable to reduce emissions of airborne carcinogens. These generic standards would be proposed simultaneously with the listing of a carcinogen as a hazardous air pollutant. The intent of this notice is to solicit comment on the generic standards EPA is currently developing.

DATES: Written comments and information should be postmarked on or before December 10, 1979.

ADDRESSES:

Comments: Written comments and information should be submitted to the Central Docket Section (A-130), U.S. Environmental Protection Agency, Attn: Docket No. A-79-13, 401 M Street, SW., Washington, D.C. 20460.

Docket: Docket No. A-79-13, containing material relevant to this rulemaking, is located in the U.S. Environmental Protection Agency, Central Docket Section, Room 2903B, 401 M Street, SW., Washington, D.C. 20460. The docket may be inspected between 8:00 a.m. and 4:00 p.m. on workdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Standards and Engineering Division (MD-13), Research Triangle Park, North Carolina 27711, Attention: Mr. Don R. Goodwin, telephone number (919) 541-5271.

SUPPLEMENTARY INFORMATION: Section 112 of the Clean Air Act as amended, 42 U.S.C. 7412, requires EPA to regulate hazardous air pollutants by establishing emission standards and, where necessary, certain other measures to protect public health. The rapidly developing body of knowledge concerning toxicology indicates that many air pollutants, primarily in the form of airborne carcinogens, may present significant risks to public health. Many of these air pollutants will likely be volatile organic chemicals. The technical complexity and diversity of the organic chemical manufacturing industry and the stringency of Clean Air Act time limits on regulation of hazardous air pollutants indicate a need to improve EPA's regulatory procedures in this area. Accordingly, as a significant part of the program for regulation of airborne carcinogens contained in the rule proposed elsewhere in today's **Federal Register**, EPA is developing generic standards for use in reducing emissions of organic chemical carcinogens listed under section 112 in the future. The use of generic standards would provide a quick, first step in the regulation of organic chemical air carcinogens.

Generic Standards

Generic standards used to regulate emission sources of carcinogenic air pollutants are standards which are independent of process or chemical and are based on the similarity of operations and equipment throughout an industry, such as the organic chemical manufacturing industry. They can be applied to similar emission sources and represent reasonable and prudent measures a responsible plant owner or operator would take in dealing with a carcinogenic air pollutant.

Consistent with the mandate of section 112 that emissions of hazardous air pollutants be reduced quickly, generic standards would be proposed for applicable emission sources simultaneously with listing of a volatile organic chemical determined to be an airborne carcinogen. Depending on the nature of the listed organic chemical and the emission sources of this chemical, generic standards may require "tailoring" in certain cases to reflect unique or unusual situations. Generic standards and the rationale supporting those standards would be published in the **Federal Register**. Additional documents outlining and summarizing the information supporting the standards would not necessarily be published. However, supporting information would be available at the time of proposal for public inspection. This supporting information would include general assessments of the economic, energy, and environmental impacts of the proposed standards.

Proposal of generic standards for applicable organic chemical emission sources would be followed by a public comment period and an opportunity for a public hearing. EPA would evaluate the comments submitted during the public hearing and comment period, make appropriate changes to the proposed generic standards, and then promulgate the generic standards. Generic standards would be followed, in most cases, by proposal of additional standards. These additional standards would be developed under the rule proposed today for regulation of airborne carcinogens.

As EPA identifies and develops additional standards, an evaluation of the reasonableness of including these requirements in future generic standards will be made. As a result, the generic standards will evolve and become more extensive as EPA's experience and expertise increase.

Implementation of Generic Standards

As discussed below, the draft generic standards focus primarily on reducing fugitive emissions through the use of an effective leak detection and repair program. There are a number of possible approaches to implementing these generic standards. The first approach would be to require the attainment of specific performance levels by the sources regulated. For example to control fugitive emissions from pump seals, a performance level could specify that no more than a certain percentage of pump seals leak. Achievement of the performance level would be enforced through tests of pump seals in a plant to determine what percentage of seals were leaking. If more leaks were found than the percentage allowed by a performance level, the source would be out of compliance and enforcement action would be taken. This approach, therefore, would be similar to the approach followed in most existing new source performance standards and national emission standards for hazardous air pollutants. Because this approach would depend on testing, rigorous enforcement of the standards would be possible. This approach also would provide each plant with complete flexibility to institute its own method of achieving and maintaining compliance with the standards. Data to establish specific performance levels, however, is not currently available, although programs underway may provide some data which could be used for this purpose. If the data developed by these programs show that this approach is feasible, future generic standards may incorporate performance levels in some areas.

A second approach to implementing generic standards would be to specify that certain work practices be followed. For example, to control fugitive emissions from pump seals, the standards would specify (1) how often pump seals must be inspected for leaks,

(2) the detection technique and procedure for determining if a leak exists, and (3) the time period within which any leak found must be repaired. Compliance with work practice requirements would be enforced through examination of records kept by the plant showing that inspections were carried out, leaks detected, and repairs made. Compliance would be monitored through use of routine reporting. This approach would, of course, provide less flexibility to the plant owner or operator. The reliance of this approach on self-reporting and recordkeeping could make enforcing generic standards difficult. However, data and information are currently available which allow the development of work practice requirements.

A third approach to implementing generic standards would use the standards as guidelines. Guidelines would provide maximum flexibility in the actions by industry; each plant could tailor its method of locating and repairing leaks to its particular situation. Guidelines would also allow innovation in control techniques. Guidelines, however, would have no legal status. Therefore, EPA could not enforce compliance with guidelines. Given the nature of the problem presented by public exposure to hazardous air pollutants and the requirements of section 112, this approach is inadequate.

The Manufacturing Chemists Association (MCA) has suggested an approach similar to that of guidelines. MCA's approach would require owners and operators to prepare and implement plant-specific plans for reducing fugitive emissions of the hazardous air pollutant. The draft generic standards would serve as guidelines for developing these plans. Plans could depart from the guidelines if an owner or operator felt the departure was justified.

MCA's suggested approach is similar to an approach used by EPA in oil pollution prevention regulation (40 CFR Part 112) promulgated in 1973 and in hazardous substance pollution prevention regulation (40 CFR Part 151) proposed in 1978 under the Clean Water Act. This approach provides each plant with flexibility and allows innovation in control techniques. In the proposal, enforcement of this approach is triggered by an identifiable event, such as discharge of hazardous substances in harmful quantities as determined in 40 CFR Part 118, and focuses on a review of the effectiveness of the plan. Enforcement of this approach is enhanced by surprise inspections which focus on review of the plan. After review of a plan, an owner or operator may be required to amend the plan. Also, the owner or operator is liable for a civil penalty for violations of requirements of the regulation.

The plan preparation approach, if used to implement generic standards, would be enforced through review of a plan to determine the effectiveness of the plan. Review of each plan would be required at some point in time. The mechanism for triggering review could be based on an identifiable event or could be based on an automatic or periodic review.

In the example of the proposed regulation under the Clean Water Act, review is triggered by an identifiable event, such as a discharge. For emission sources covered by the draft generic standards, an identifiable event to trigger review of a plan is not readily apparent. These emission sources are spread out in an organic chemical plant and often require a measurement device for detection. A mechanism for triggering review other than the identifiable event mechanism would be necessary.

Another mechanism for triggering of review plans would follow procedures similar to those used under 40 CFR Part 51 for development of State Implementation Plans. These procedures would require automatic preparation of plans and their submittal to EPA for review. After a review to determine the effectiveness of a plan, the plan would be approved or disapproved. Approved plans would be incorporated into 40 CFR Part 61, thus assuring their implementation and allowing their enforcement. Incorporating plans into 40 CFR Part 61 would be very time consuming. The time and resources required to review and determine the effectivieness of a plan and then to incorporate the plan into 40 CFR Part 61 prohibit the use of this mechanism.

Review of a plan to determine its effectiveness is central to enforcement of the plan proparation approach. The use of an identifiable event to trigger review of a plan does not appear reasonable. The use of automatic review procedures similar to those used under 40 CFR Part 51 is prohibited by the time and resources required by the procedures. Thus, the plan preparation approach is limited in its usefulness.

EPA recognizes the general desirability of the performance level approach to generic standards. However, data and information are not available to develop these types of generic standards at the present time. Although EPA recognizes the possible use of the plan preparation approach, the time and resources required to establish effective plans prohibit the usefulness of this approach. Therefore, in developing draft generic standards, EPA has chosen the approach of specifying detailed work procedures as the most viable approach now available. This is consistent with EPA control techniques guidelines documents which recommend this approach. EPA invites public comment on advantages and disadvantages of each of the approaches discusesed above.

Draft Generic Standards

The draft generic standards are outlined in Attachment A to this notice. These draft standards would be proposed for sources of carcinogenic organic chemicals listed under section 112 of the Clean Air Act. When proposing generic standards for regulation of carcinogenic organic hazardous air pollutants, EPA would evaluate the appropriateness of each standard outlined in Attachment A. Tailoring may be required and therefore in some instances, additions to these draft standards may be made, and in other instances, deletions may be made.

To achieve the goal of expeditious control of carcinogenic emission sources, the draft generic standards were based on the following selection criteria. First, draft generic standards were selected which are broadly applicable to organic chemical emission sources. Second, standards were selected which lend themselves to quick implementation and third, standards were selected which do not require substantial capital expenditure. Finally, standards were selected which would be consistent with any additional standards promulgated later; thus, the generic standards could be instituted with confidence.

The draft generic standards categorize emission sources of organic chemicals into six groups. These groups are: fugitive emissions, chemical storage, chemical transfer and handling, waste disposal, process vents, and air pollution control devices. All of these emission sources lend themselves to control through the use of generic standards. In accordance with the selection criteria, the draft generic standards would require control of these emission sources, for the most part, through the use of improved operation, maintenance, and housekeeping practices.

The major focus of the draft generic standards is leak detection and repair. The draft standards would require inspection of potential fugitive emission sources at specific intervals to locate leaks which require repair. These fugitive emission sources consist of equipment which comes into contact with any liquid or gaseous mixture containing more than a specified minimum concentration of the listed pollutant. Inspection includes routinely monitoring potential fugitive emission sources to detect gaseous leaks, and routinely observing sources to detect liquid leaks. If an organic chemical concentration greater than a defined action level is measured at the interface between the source and the atmosphere using a portable detection device, it is considered that a gaseous leak has been detected. Upon monitoring, if a gaseous leak is detected, the leak must be repaired within a specified repair interval. Upon observation, if a liquid leak is detected, the emission source is monitored. If a gaseous leak is detected, then repair is required within the specified repair interval. Repair of the leak would be confirmed by monitoring the source to determine that the concentration is less than the defined action level. Inspection intervals ranging from weekly to annually are currently being considered. Values of 1 to 10 percent for the minimum concentration in the mixture, 5 to 15 days for the repair interval, and 1,000 to 10,000 parts per million by volume measured as hexane (ppmv) as the action level or definition of a leak are also currently being considered.

If repair of a leak would result in more emissions than cumulative emissions from the leak prior to a scheduled process or operation shutdown, or if repair of a leak is not possible because of location, service, or unavoidable circumstances, the required repair could be delayed pending approval of EPA. EPA Regional Enforcement Divisions must be notifed by telegram or telephone within a specified number of days of requests for delay in the repair of a leak, and would retain the authority to disapprove any requests. If, however, EPA failed to respond within a specified number of days to a request for delay in repair of a leak, approval of the request would be granted automatically. Values of 2 to 5 days from the finding of a leak for requesting of a delay, and 2 to 5 days from receiving of a delay request for EPA response to the request, are being considered. Rather than follow this procedure for all leaks, EPA is considering this reporting procedure only for requests for delays in repair of excessive leaks. An excessive leak would be defined as some emission concentration greater than the current 1,000 to 10,000 ppmv range being considered as the definition of a leak. For example, an excessive leak could be defined as a concentration of equal to or greater than 100,000 ppm. Because either of these approaches is likely to require excessive resources and may be difficult to enforce, EPA is requesting comment on their feasibility and alternative approaches which could be employed.

The numerical values of the specific requirements in the draft generic standards were based on preliminary evaluation of various engineering studies. In most cases, the requirements are illustrated by a range of values that are being considered. The inspection intervals, which could vary from weekly to annually for equipment in liquid service and from monthly to quarterly for equipment in gaseous service, were based on data developed from test programs conducted within refinery and petrochemical plants. In general, the inspection intervals are based on the observed frequency of leaks and their expected emission rates. Preliminary evaluation of fugitive emission sources within benzene production units of petroleum refineries indicates that the inspection interval influences potential emission reduction more than other factors, such as definition of a leak, or repair interval. Currently, a monthly inspection interval for equipment in gaseous and liquid service appears the most reasonable inspection interval.

The repair interval which ranges from 5 to 15 days was based on observations in the petroleum refinery and petrochemical industry and on expected reporting requirements. In many cases, repairs could be made sooner than 5 days. However, there are unavoidable circumstances which can delay repair beyond 5 days. Circumstances, such as a plant's parts stock being depleted, are generally avoidable. While a plant normally stocks sufficient spare parts, there may be unique circumstances leading to the depletion of a plant's parts stock. Requests for delays in repair of leaks will be approved only where repair is likely to result in emissions in excess of the emissions resulting from the leak, or where repair is not possible because of circumstances which EPA considers unavoidable. Thus, the objective in selecting the repair interval was to select a time interval consistent with the ability of a plant to repair a leak expeditiously, but not to select a time interval so short that it requires plants to continually request repair delays for repair of routine leaks. Preliminary evaluation of fugitive emission sources within benzene production units of petroleum refineries indicates that the emission reduction gained by going from 15 to five days is small. Thus, the 15-day repair interval is currently considered reasonable.

The purpose of specifying a minimum concentration level of the pollutant in gaseous or liquid mixtures is to exclude process streams with trace quantities of the hazardous pollutant. The 10 percent upper boundary for this concentration level is based on analogy with the current vinyl chloride national emission standard. The lower boundary of 1 percent is based on estimates that this level, under certain conditions, would allow emissions of less than 10 ppmv of the hazardous air pollutant. Preliminary evaluation of fugitive emission sources within benzene production units of petroleum refineries indicates that the 10 percent minimum concentration level is most reasonable. Going from 10 percent to 1 percent would greatly increase the number of sources covered by the standards without a corresponding reduction in emissions. Therefore, 10 percent is currently considered the most reasonable minimum concentration level.

A hexane-based definition of a gaseous leak at 10,000 ppmv as defined in an EPA control techniques guideline document, "Control of Volatile Organic Compound Leaks from Petroleum Refinery Equipment" (EPA–450/2–78–036), was considered the maximum for use in regulating organic hazardous air pollutants. The 1000 ppmv definition of a leak is a simple reduction of the value in the control techniques guideline. The 1000 ppmv value appears a reasonable lower value because some leakage is unavoidable for emission sources covered by the draft generic standards. The 10,000 ppmv and 1000 ppmv concentrations would be measured at the interface between the leak and the atmosphere. These values are based on a technical evaluation of leaks and are not based on an evaluation of potential health risk of leaks. Preliminary evaluation of fugitive emission sources within benzene production units of petroleum refineries indicates that the 10,000 ppmv action level is more reasonable than the 1000 ppmv action level. Experience indicates that repair of leaks will result in emission reduction with an action level of 10,000 ppmv. However, experience does not indicate that repair of leaks with concentrations between 10,000 and 1000 ppmv will result in emission reduction. Therefore, 10,000 ppm is currently considered the most reasonable action level.

Miscellaneous Issues

Continuous area-wide monitoring to measure ambient concentrations of specific hazardous organic compounds was considered. EPA experience with the effectiveness of area-wide monitoring indicates that this technique is not as effective in locating leaks as a seal-by-seal inspection, which is the technique outlined in the draft generic standards. The use of area-wide monitoring may add to the effectiveness of seal-by-seal inspection, but experience indicates that this added effectiveness in minimal. Also, area-wide monitoring is a capital intensive technique. Thus, continuous area-wide monitoring seems impractical for the draft generic standards.

On the other hand, some organic chemical facilities currently have leak detection and repair programs based on continuous area-wide monitoring of ambient air hydrocarbon concentrations. In some cases, these programs or other types of leak detection and repair programs might be as effective in reducing fugitive emissions as the program described in the draft generic standards. During meetings with industry associations, it has been suggested that an alternative to requiring duplication of equally effective leak detection and repair programs should be developed. This suggestion is reasonable. However, it depends upon determining equivalency of various programs with the draft generic standards. Three basic criteria seem necessary for any technique for determining equivalency. These criteria are: (1) the technique for determining equivalency should minimize both industry and Agency resource requirements; (2) the type of data necessary to demonstrate equivalency should normally be available or easily developed; and (3) the technique should be quantitative, with little room for discretion or argument concerning equivalency. EPA specifically invites comments on possible approaches to determining equivalency that meet these criteria.

The draft generic standards also include requirements for recordkeeping and reporting. Recordkeeping and reporting are considered necessary to insure that the improved operation, maintenance, and good housekeeping practices generally required by the draft generic standards are put into practice quickly, effectively, and consistently. Detected leaks would be recorded in a log and the corrective actions noted when a leak is repaired. EPA would be notified on a quarterly basis of leaks not repaired within the specified repair interval; these quarterly reports would include a listing of those units and components which leaked past the specified repair interval, date and duration of these leaks, and concentrations of the hazardous organic chemicals. In some cases, recordkeeping and reporting would be a duplication of other EPA requirements. Where duplication is unnecessary, duplication would not be required in the generic standards.

In early versions of the draft generic standards, recordkeeping and reporting requirements were the only measures used to ascertain compliance with the standards. In meetings with environmental groups, it was suggested that either EPA or a certified independent contractor perform scheduled inspections, observations and monitoring to confirm compliance with the standards. This suggestion would be extremely burdensome on EPA resources. Therefore, it has not been included in the draft generic standards. This suggestion, however, did lead to incorporation of an approach requiring the plant's owner or operator to notify EPA one week prior to the date of certain inspections, observations and monitoring. This would give EPA the opportunity to observe these activities and determine compliance with the generic standards, without requiring extensive resource commitments. EPA is actively seeking specific comments on this approach to enforcement of the draft generic standards, and specific comments on alternative approaches.

Minimal capital expenditure was a criterion for selection of the draft generic standards. The most readily identifiable capital expenditure required by the draft standards is the purchase of the portable organic vapor monitor. The cost of two such monitors used by EPA totals about $10,000. A preliminary estimate of annual leak detection and repair costs for benzene production units within a petroleum refinery is about $25,000 per year. This estimate includes the amortized cost of two monitors, annual operating cost of the monitors, annual cost of labor for leak detection, annual parts and labor cost for leak repair, and annual cost of administrative support. It does not, however, include cost savings, which could be significant, for the value of the retained organic chemicals. EPA is interested in specific information on the cost of the draft generic standards.

The draft standards would also require the owner or operator to submit to EPA within four months following the promulgation of a specific generic standard an estimate of emissions of the hazardous air pollutant. This estimate would be based on nameplate operating capacity and would be categorized by emission source.

Specific Requests

EPA is requesting comments on the approaches discussed under the implementation of Generic Standards section of this preamble. EPA is interested in comment on other approaches for implementing generic standards and is specifically interested in any data and information which could lead to the development of performance level generic standards and means for enforcing the plan preparation approach advocated by MCA.

EPA is also interested in specific comments on the following aspects of the draft generic standards: (1) identification of various operations, procedures and equipment that are sources of emissions of organic chemicals; (2) identification of demonstrated control techniques which can be broadly applied to these sources of emissions; (3) costs associated with the requirements listed in the draft generic standards; (4) standard equipment, designs, or operating and maintenance procedures (including periods of start-up and shutdown) for controlling emissions from operations that may emit organic chemicals; (5) comments on the various numerical ranges included in the draft generic standards; (6) comments on the approach of requiring requests for delays in repair of leaks or requests for delays in repair of excessive leaks only, and the specified levels of an excessive leak; (7) identification of techniques or procedures which could be used to determine the equivalency of alternative leak detection and repair programs; (8) identification of ways to reduce the burden of recordkeeping and reporting on the source and EPA while maintaining the effectiveness of the draft generic standards; (9) the enforcement approach of the draft generic standards and alternative approaches to the enforcement of these standards; and (10) specific information on leak detection and repair programs similar to the program in the draft generic standard; for each program, the information should include (a) chemical name and the process used to produce the chemical, (b) a detailed description of the leak detection and repair program, (c) the number of pieces of each type of equipment affected by the program, (d) separate costs for monitoring, equipment, installation of equipment, labor for monitoring, repair parts, labor for repair, and overhead, and (e) an estimate of the emission reduction potential and the product recovery credits, including an explanation of the estimation method.

This advance notice of proposed rulemaking is issued under the authority of sections 112, 114, and 301(a) of the

Clean Air Act as amended [42 U.S.C. 7412. 7414 and 7601(a)].

Dated: August 22, 1979.

Douglas M. Costle,
Administrator.

Attachment A—Draft Generic Standards

I. Applicability

Except as noted below, these standards would apply, for applicable emission sources, to the owner or operator of equipment affected by these standards. These standards would affect equipment which comes into contact with a liquid mixture containing 1 [10] percent or more by weight, or a gaseous mixture containing 1 [10] percent or more by volume, of organic chemicals listed by EPA as carcinogenic hazardous air pollutants under § 112 of the Clean Air Act.

Note.—Some requirements are illustrated with one end of the range of values currently being considered placed in brackets.

II. Fugitive Emissions

(A) All compressor seals and pipleline valves in gaseous service shall be monitored as provided in section IX (A) quarterly [monthly]. Whenever a concentration of 1.000 ppmv (parts per million by volume as hexane) [10.000 ppmv] is detected, a leak exists. Whenever a leak exists, it shall be repaired within 5 [15] days, except as provided in sections II (F) and (G).

(B) All pump seals, pipeline valves in liquid service, and process drains shall be monitored as provided in section IX (A) annually [monthly]. Whenever a concentration of 1.000 ppmv [10.000 ppmv] is detected, a leak exists. Whenever a leak exists, it shall be repaired within 5 [15] days, except as provided in sections II (F) and (G).

(C) Pressure relief valves, except those vented to a control device, shall be monitored as provided in section IX (A) quarterly [monthly]. Whenever a concentration of 1.000 ppmv [10.000 ppmv] is detected, a leak exists. Whenever a leak exists, it shall be repaired within 5 [15] days, except as provided in sections II (F) and (G).

(D) Whenever a rupture disk installed ahead of a pressure relief valve ruptures, it shall be replaced within 5 [15] days.

(E) Pump seals shall be observed for liquid leaks weekly as provided in section IX (B). Whenever liquids are observed running or dripping from a pump seal, the seal shall be monitored as provided in section IX (A). Whenever a concentration of 1.000 ppmv [10.000 ppmv] is detected, a leak exists. Whenever a leak exists, it shall be repaired within 5 [15] days, except as provided in sections II (F) and (G).

(F) When repair would clearly result in emissions in excess of the emissions resulting from the leak, repair may be delayed, as provided in section VIII (G), until a regularly scheduled shutdown. In determining whether emissions from repair of a leak would exceed those resulting from the leak, cumulative emissions over the time until the regularly scheduled shutdown shall be considered.

(G) Where repair is not possible because of location, service, or unavoidable circumstances, repair may be delayed, as provided in section VIII (G), until a time when repair is possible.

(H) Housekeeping practices.

(1) All liquid spills shall be cleaned up within 8 [24] hours. Acceptable cleanup methods include siphoning into a storage container (e.g., a portable spill tank), chemical absorption and other appropriate methods. Cleanup methods shall be in compliance with requirements under 40 CFR Part 151 (proposed).

(2) Wherever a valve is located at the end of a pipe or line, the pipe or line shall be sealed with a second valve, blind flange, plug or cap. This requirement does not apply to pressure relief valves.

(3) Whenever liquid or gaseous samples are taken from lines or equipment, a closeable container shall be used and sample valves shall be closed between samples. Liquid and gas that is bled from sample lines shall also be collected. All sample and bled material shall be returned to the process or disposed as provided in section V.

III. Chemical Storage

For storage equipment of greater than 40 [150] cubic meters capacity:

(A) All fixed-roof storage vessels exposed to direct sunlight shall be painted white. No more than 20 percent of the surface of the storage vessel, or 20 square meters, whichever is less, shall be covered with writing and figures. This requirement shall not apply to insulated, pressurized, or controlled temperature storage vessels and storage vessels equipped with a refrigerated condenser, carbon adsorber, incinerator, or any combination of these.

(B) Tank connection flanges and manway seals shall be monitored as provided in section IX (A) quarterly [monthly]. Whenever a concentration of 1.000 ppmv [10.000 ppmv] is detected, a leak exists. Whenever a leak exists, it shall be repaired within 5 [15] days, except as provided in sections II (F) and (G).

(C) Conservation vents on fixed roof storage vessels shall be inspected and, if necessary, maintained quarterly [monthly].

(D) Seals on floating roof storage vessels shall be inspected and, if necessary, maintained quarterly [monthly].

IV. Chemical Transfer and Handling

For equipment used in transferring and handling to or from rail cars, tank trucks, barges, and other transfer or transportation vehicles, all seals and fittings, excluding flanges, shall be monitored as provided in section IX (A) quarterly [monthly]. Whenever a concentration of 1000 ppmv [10.000 ppmv] is detected, a leak exists. Whenever a leak exists, it shall be repaired within 5 [15] days, except as provided in sections II (F) and (G).

V. Waste

(A) For waste covered by regulation under the Resource Conservation and Recovery Act (RCRA) and containing greater than 1 [10] percent by weight of a pollutant affected by section I, the following requirements would apply:

(1) Waste from sampling shall be disposed by returning it to the process stream, by reducing it in an appropriate air pollution control device, or by absorbing or adsorbing it with a liquid or solid. These absorbents and adsorbents, except those returned to the process stream, shall then be wastes.

(2) Waste shall be stored in vapor-tight containers.

(3) A Regional Administrator may require an owner/operator, who is demonstrating that treatment or disposal of a volatile waste (i.e., greater than 78 mm Hg) will not contribute airborne contaminant to the atmosphere, as provided in the NOTE in 40 CFR 250.45 (proposed), to demonstrate that treatment or disposal of the pollutant affected by section I will not contribute the airborne contaminant to the atmosphere such that concentrations above the source have the potential to increase risk to the public.

(B) For waste containing greater then 1 [10] percent by weight of a pollutant affected by section I and not covered by regulation under RCRA, the following requirements would apply:

(1) Disposal and treatment of waste shall be in compliance with standards for treatment/disposal, as provided in 40 CFR 250.45 (proposed).

(2) Disposal and treatment of waste shall be in compliance with sections V(A) (1), (2), and (3).

VI. Process Vents

Where a process vent may emit a hazardous organic chemical or any mixture containing 1 [10] percent or more by volume of hazardous chemicals, procedures describing process operation, including start-up, shutdown, normal and emergency procedures, shall be written and available to appropriate process operators. Operators shall receive an annual minimum of two hours of training in these procedures.

VII. Air Pollution Control Devices

Where a control device is used to reduce air pollutant emissions of a hazardous organic chemical, procedures outlining normal and emergency procedures for the control device shall be written and available to all operators. These procedures shall include at least all operating and maintenance procedures recommended by the control device manufacturer. Operators shall receive an annual minimum of two hours of training in these procedures.

VIII. Recordkeeping and Reports

(A) When a leak is detected, the presence of the leak shall be noted on a survey log as illustrated in Figure 1. Other information as shown shall be included on this survey log. Figure 1 is used to illustrate the minimum acceptable information to be recorded and is not a required form. A weatherproof and readily visible tag bearing an identification number and the date that the leak was detected shall be affixed to the leaking component. After the leak has been repaired, the remaining portion of the survey log shall be completed and the tag discarded. The survey log shall be retained for at least two years after the repair is completed.

(B) Quarterly reports shall be submitted to the appropriate EPA Regional Office, Enforcement Division Director. Each report shall include a list as shown in Figure 2 of all leaks that were located since the last report and not repaired within 5 [15] days. Each report shall include a separate list as shown in Figure 2 of all leaks which were reported in a previous quarterly report and which have not been repaired. In addition, each report shall include a statement signed by the plant manager confirming that all weekly, [monthly], quarterly and annually inspecting, observing and monitoring has been performed.

(C) When a spill occurs, records of the date and the time of the spill and the cleanup shall be maintained for a minimum of two years. The records shall include an estimate of the quantity of the lost material, concentration of hazardous organic chemical, actions taken for the cleanup, and method of final disposal.

(D) When an owner or operator must comply with requirements in section VI, records of the times and approximate duration of all safety valve discharges shall be maintained for a minimum of two years. A summary of these safety valve discharges shall be reported annually to the appropriate EPA Regional Office, Enforcement Division Director.

(E) Written operating procedures as described in sections VI and VII shall be maintained and updated as necessary.

(F) Within four months of the date of promulgation of this section, the owner or operator of any facility subject to this section shall submit to the Administrator an evaluation of the emissions from the sources of the hazardous pollutant specified in this paragraph. This evaluation shall be an engineering estimate and shall be subject to the approval of the Administrator. The evaluation shall include as a basis the nameplate production rate, include the appropriate operating production rate, provide estimation of mass emissions from the sources in sections, II, III, IV, V, VI, and VII, and explain the technique for the estimation.

(G) A request for delay in repairing a leak must begin within two [five] days after locating the leak. The owner or operator making a delay request shall provide by telephone or telegram all necessary information for making an evaluation at the time of the initial request to the appropriate EPA Regional Office, Enforcement Division Director, and as required by the EPA Regional Office. In evaluating the request, the EPA Regional Office will consider the expected length of the delay, the reasons for the delay, the consequences of no delay, and other relevant factors. If the EPA Regional Office does not deny a requested delay within two [five] days after receipt of the request, the delay request will be granted automatically.

(H) Whenever an owner or operator is unable to comply with the two [five]-day requirement as provided in section VIII (G), he shall notify by telephone or telegram the appropriate EPA Regional Office, Enforcement Division Director, within one working day after determining the inability to comply. When notifying the appropriate EPA Regional Office, the owner or operator shall provide an explanation of the inability to comply with section VIII (G). In evaluating the inability to comply with section VIII (G), the EPA Regional Office shall consider the reasons for the inability to comply. After evaluation, the EPA Regional Office may allow application of section VIII (G) for delay requests after two [five] days after the plant locates a leak.

(I) At least one working week prior to each [monthly], quarterly, or annual inspections, observations, and monitoring, an owner or operator shall notify the appropriate EPA Regional Office, Enforcement Division Director, by telephone or telegram that such inspections, observations, or monitoring are scheduled.

IX. Test Methods

(A) Monitoring hazardous organic chemicals emissions.

This test method describes the procedures used to detect volatile organic chemical (VOC) leaks from sources of hazardous air pollutants. A portable test device is used to survey individual equipment leak sources. The specifications and performance criteria for the test instrument are included.

(1) Apparatus.

(a) Monitoring Instrument.

The VOC detection instrument used in this procedure may be of any type that is designed to respond to total hydrocarbons. The instrument must incorporate appropriate range options so that source levels can be measured. The instrument will be equipped with a pump so that a continuous sample is provided to the detector. The instrument meter readout will be such that the scale can be read to ±5 percent at 1,000 ppmv [10,000 ppmv]. The instrument must be capable of achieving the performance criteria given in Table 1. The definitions and evaluation procedures for each parameter are given in subcategory (3).

Table 1.—*Monitoring Instrument Performance Criteria*

Parameter	Specification
1. Zero drift (2-hour)	≤ 5 ppmv.
2. Calibration drift (2-hour)	≤ 5% of the calibration gas value.
3. Calibration error	≤ 5% of the calibration gas value.
4. Response time	≤ 5 seconds.

The instrument must be subjected to the performance evaluation test prior to being placed in service and every three months thereafter.

The performance evaluation test is also required after any modification or replacement of the instrument detector.

(b) Calibration Gases.

The VOC detection instrument is calibrated so that the meter readout is in terms of ppmv hexane. The calibration gases require for monitoring and instrument performance evaluation are a zero gas (air, <3 ppmv hexane) and a hexane in air mixture of about 1,000 ppmv [10,000 ppmv]. If cylinder calibration gas mixtures are used, they must be analyzed and certified by the manufacturer to be within ±2 percent accuracy. Calibration gases may be prepared by the user according to any accepted gaseous standards preparation procedure that will yield a mixture accurate to within ±2 percent. Alternative calibration gas species may be used in place of hexane if a relative response factor for each instrument is determined so that calibrations with the alternative species may be expressed as hexane equivalents on the meter readout.

(2) Procedures.

(a) Calibration.

Assemble and start up the VOC analyzer according to the manufacturer's instructions. After the appropriate warm-up period and zero or internal calibration procedure, introduce the 1,000 ppmv [10,000 ppmv] hexane or hexane equivalent calibration gas into the instrument sample probe. Adjust the instrument meter readout to correspond to the calibration gas value.

(b) Individual Source Surveys.

Place the instrument sample probe inlet at the surface of the component interface where leakage could occur. During sample collection, the probe should be moved along the interface surface with special emphasis placed on positioning the probe inlet at the local upwind and downwind side of the component interface. This general technique is applied to specific types of equipment leak sources as follows:

(i) Valves—The most common source of leaks from block (glove, plug, gate, ball, etc.) and control valves is at the seal between the stem and housing. The probe should placed at the interface where the stem exits the seal and sampling should be conducted on all sides of the stem. For valves where the housing is a multipart assembly, or where leaks can occur from points other than the stem seal, these sources should also be surveyed with the probe inlet moved along the surface of the interface.

(ii) Flanges and other connections—For welded flanges, the probe should be placed at the outer edge of the flange-gasket interface and samples collected around the circumference of the flange. For other types of non-permanent joints such as threaded connections, a similar traverse is conducted at the component interface.

(iii) Pumps and compressors—A circumferential traverse is conducted at the outer surface of the pump or compressor shaft and housing seal interface. In cases where the instrument probe cannot be placed in contact with a rotating shaft, the probe inlet must be placed within one centimeter of the shaft-seal interface. In those cases where the housing configuration of the pump or compressor prevents the complete traversing of the seal periphery, all accessible portions of the shaft seal should be probed. All other joints where leakage could occur will also be sampled with the probe inlet placed at the surface interface. For pumps or compressors using sealing oil, the vent from the seal oil reservoir will be sampled by placing the probe inlet at approximately the centroid of the vent area to atmosphere.

(iv) Pressure relief devices—The physical configuration of most pressure relief devices prevents sampling at the sealing surface interface. However, most devices are equipped with an enclosed extension, or horn. For this type device, the probe inlet is placed at approximately the centroid of the exhaust area to atmosphere.

(v) Process drains—For open process drains, the sample probe inlet will be placed at approximately the centroid of the area open to the atmosphere. For covered drains, the probe should be placed at the surface of the cover interface and a circumferential traverse shall be conducted.

(3) Instrument performance evaluation procedures.

(a) Definitions.

Zero Drift—The change in the instrument meter readout over a stated period of time of normal continuous operation when the VOC concentration at the time of measurement is zero.

Calibration Drift—The change in the instrument meter readout over a stated period of time of normal continuous operation when the VOC concentration at the time of measurement is the same known upscale value.

Calibration Error—The difference between the VOC concentration indicated by the meter readout and the known concentration of a test gas mixture.

Response Time—The time interval from a step change in VOC concentration at the input of the sampling system to the time at which 95 percent of the corresponding final value is reached as displayed on the instrument readout meter.

(b) Evaluation Procedures.

At the beginning of the instrument performance evaluation test, assemble and start up the instrument according to the manufacturer's instructions for recommended warmup period and preliminary adjustments.

(i) Zero and calibration drift test—Calibrate the instrument per the manufacturer's instructions using zero gas and a calibration gas representing about 1,000 ppmv [10,000 ppmv]. Record the time, zero, and calibration gas readings (example data sheet shown in Figure 3). After 2 hours of continuous operation, introduce zero and calibration gases to the instrument. Record the zero and calibration gas meter readings. Repeat for three additional 2-hour periods.

(ii) Calibration error test—Make a total of nine measurements by alternately using zero gas and a calibration gas mixture corresponding to about 1,000 ppmv [10,000 ppmv]. Record the meter readings (example data sheet shown in Figure 4).

(iii) Response time test procedure—Introduce zero gas into the instrument sample probe. When the meter reading has stabilized, switch quickly to the 1,000 ppmv [10,000 ppmv] calibration gas. Measure the time from concentration switching to 95 percent of final stable reading. Perform this test sequence three (3) times and record the results (example data sheet given in Figure 5).

(iv) The calibration error test and the response time test may be performed during the zero and calibration drift test.

(c) Performance Calculations.

All results are expressed as mean values, calculated by:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{n} X_i$$

where:

X_i = value of the measurements
Σ = sum of the individual values
$\bar{x}$ = mean value (the absolute value of the mean value)
n = number of data points

The specific calculations for each performance parameter are indicated on the respective example data sheet given in Figures 3, 4, and 5. The example data sheets are constructed so that performance criteria tests can be conducted on 1,000 ppmv [10,000 ppmv] levels of gas.

(B) Observing for liquid leaks of hazardous organic chemicals.

This test method describes the procedures used to detect organic chemical liquid leaks from sources of hazardous air pollutants. The method uses visual observations to determine the existence of a liquid leak.

(1) Apparatus.

No apparatus is needed to perform this method.

(2) Procedure.

Observing from vantage points to sufficiently inspect the source, determine if any chemicals are leaking. A liquid leak exists if any chemical liquid is observed running or dripping from the surface of the source. When a chemical liquid is dripping to a surface which is in the vicinity of a possible hazardous pollutant emission source, locate the source of the liquid.

Leak Detection and Repair Survey Log

Instrument Operator:______________

Recorder:_____________________

TAG NUMBER	UNIT	COMPONENT	HAZARDOUS ORGANIC CHEMICAL CONCENTRATION IN STREAM	DATE LEAK LOCATED	DATE MAINTENANCE PERFORMED	COMPONENT RECHECK AFTER MAINTENANCE	
						DATE	INSTRUMENT READING (PPM)

DRAFT

FIGURE 1. Example Monitoring Survey Log Sheet.

TAG NUMBER	UNIT	COMPONENT	HAZARDOUS ORGANIC CHEMICAL CONCENTRATION IN STREAM	DATE LEAK LOCATED	DATE MAINTENANCE PERFORMED	DATES MAINTENANCE ATTEMPTED	REASONS REPAIRS POSTPONED OR FAILED

DRAFT

FIGURE 2. Example Leak Report.

Instrument ID: ________________ Calibration Gas Data: ______ ppmv

Date and Time	Zero Reading ppmv	Zero Drift ppmv	Calibration Gas Reading ppmv	Calibration Drift ppmv
Start				
1.				
2.				
3.				
4.				

DRAFT

Mean (1) Value:

Zero Drift = ____ ppmv

Calibration Drift = $\frac{\text{mean calibration drift}}{\text{calibration gas value}}$ x 100 = _____%

---

(1)Absolute Value

Figure 3. Zero and Calibration Drift Determination

Instrument ID ____________

Calibration Gas Mixture Data

_______ppmv

Run No.	Calibration Gas Concentration, ppmv	Instrument Meter Reading, ppmv	Difference,(1) ppmv
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

DRAFT

Mean Difference(2) __________

Calibration Error = $\frac{\text{Mean Difference}^{(2)}}{\text{Calibration Gas Concentration}}$ = ________

---

(1)(Calibration Gas Concentration - Instrument Reading)
(2)Absolute Value

Figure 4. Calibration Error Determination

Instrument ID _____________ _____

Calibration Gas Concentration ______ppmv

95% Response Time:

1. _____Seconds
2. _____Seconds
3. _____Seconds

DRAFT

Mean Response Time _____Seconds

Figure 5. Response Time Determination

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1562-2, Docket No. OAQPS 79-14]

Proposed Policy and Procedures for Indentifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer; Advance Notice of Proposed Generic Standards; Public Comment Period

AGENCY: Environmental Protection Agency.

ACTION: Notice of extension of public comment period.

SUMMARY: This notice extends the period for comment on proposed and procedures for identifying, assessing, and regulating carcinogens emitted into the ambient air from stationary sources. The comment period is extended from August 12, 1980 through the public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens, tentatively scheduled for early November, 1980. Notice of the date by which comments are due will accompany the announcement of the meeting date and location.

DATES: The public comment period on the proposed policy and ANPR will close following the public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens tentatively scheduled for early November, 1980.

ADDRESSES: All written comments on the proposed policy and ANPR should be addressed to: Central Docket Section, Gallery 3, West Tower, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. Attn.: OAQPS 79-14 (proposed policy) or A 79-13 (ANPR).

Information on which the proposed policy and ANPR are based as well as the written comments received and transcripts of the public hearings are available for public inspection and copying at the Central Docket Section.

FOR FURTHER INFORMATION CONTACT: Mr. Joseph Padgett, Telephone 919-541-5204 (FTS 629-5204).

SUPPLEMENTARY INFORMATION: On October 10, 1979, the Environmental Protection Agency proposed in the **Federal Register** (44 FR 58642) a policy and procedures for identifying, assessing, and regulating carcinogens emitted into the ambient air from stationary sources. In the same **Federal Register** (44 FR 58662), EPA published an advance notice of proposed rulemaking (ANPR), soliciting comments on draft generic work practice and operational standards for volatile organic compounds which could be applied quickly to reduce emissions of airborne carcinogens from certain source categories.

Interested individuals were invited to submit written comments on the proposed policy and ANPR by February 21, 1980. This was extended to April 14, 1980 and again to August 12, 1980 in order to afford additional opportunity for public comment.

Based on the written and oral comments received on the proposed policy, EPA has determined that further public discussion of certain major scientific issues is warranted. The format for this discussion will be a public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens tentatively scheduled for early November, 1980. Once the date for this meeting is determined, an announcement will be published in the **Federal Register**. The meeting announcement will include notice of the comment period deadline and the date of by which material rebutting, responding to, or supplementing written or oral comments submitted at the Science Advisory Board meeting must be submitted to EPA.

Dated: August 8, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation.

[FR Doc. 80-24610 Filed 8-12-80; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 61

[FRL 1710-3; Docket Nos. OAQPS 79-14 and A 79-13]

Proposed Policy and Procedures for Identifying, Assessing, and Regulating Airborne Substances Posing a Risk of Cancer; Public Comment Period

AGENCY: Environmental Protection Agency (EPA).

ACTION: Closure of Public Comment Period.

SUMMARY: This notice announces closure of the period for public comments on the proposed airborne carcinogen policy and on the advance Notice of Proposed Generic Standards (ANPR) published concurrently by EPA October 10, 1979.

DATES: Comments on the proposed policy and ANPR should be postmarked no later than January 22, 1981.

ADDRESS: All written comments on the proposed policy and ANPR should be addressed to: Central Docket Section, Gallery 3, West Tower, Waterside Mall, 401 M Street, SW., Washington, D.C. 20460. ATTN: OAQPS 79-14 (proposed policy) or A 79-13 (ANPR).

Information on which the proposed policy and ANPR are based as well as the written comments received and transcripts of the public hearings are available for public inspection and copying at the Central Docket Section.

FOR FURTHER INFORMATION CONTACT: Mr. Bob Schell, Telephone 919-541-5345 (FTS: 629-5345).

SUPPLEMENTARY INFORMATION: On October 10, 1979, the Environmental Protection Agency proposed in the **Federal Register** (44 FR 58642) a policy and procedures for identifying, assessing and regulating carcinogens emitted into the ambient air from stationary sources. In the same **Federal Register** (44 FR 58662), EPA published an advance notice of proposed rulemaking (ANPR) soliciting comments on generic work practice and operational standards for volatile organic compounds which could be applied quickly to reduce emissions of airborne carcinogens from certain source categories.

EPA has extended the public comment period on the subject rulemakings several times (44 FR 70196, 45 FR 6960, 45 FR 25828, 45 FR 53842) to accommodate the requests of concerned individuals and organizations. The dockets for these rulemakings currently include more than 200 written submissions and the oral transcripts of three public hearings.

In the most recent **Federal Register** notice (45 FR 53842, August 13, 1980), the Agency announced an extension of the comment period to permit further consideration of certain scientific issues raised during the public hearings and in the written comments. The notice explained that the consideration of these issues would include a public meeting of EPA's Science Advisory Board Subcommittee on Airborne Carcinogens tentatively scheduled for November 1980. The Subcommittee had been previously scheduled to meet September 4-5, 1980 to review EPA carcinogenicity and exposure assessments on several substances identified as possible candidates for regulation as airborne carcinogens. In the course of this review the Subcommittee was able to devote a considerable part of the meeting to a discussion of several basic scientific issues relevant to the proposed policy, including carcinogenicity evaluation and risk estimation. Based on the SAB's discussion of basic scientific issues in its September meeting, EPA has concluded that a further meeting of the SAB prior to finalization of the airborne carcinogen policy is unnecessary. For these reasons, the comment period will be closed thirty days after publication of this notice.

Dated: December 16, 1980.

David G. Hawkins,

Assistant Administrator for Air, Noise and Radiation

[FR Doc. 80-3976[illegible] Filed 12-22-80; 8:45 am]

ENVIRONMENTAL PROTECTION AGENCY

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

RADIONUCLIDES

National Emission Standards for Hazardous Air Pollutants; Addition of Radionuclides to List of Hazardous Air Pollutants

AGENCY: Environmental Protection Agency.

ACTION: Addition to List of Hazardous Air Pollutants.

SUMMARY: This notice announces the Administrator's decision to list radionuclides as hazardous air pollutants under Section 112 of the Clean Air Act.

ADDRESSES: Docket No. A-79-11, containing material relevant to this action, is located in the U.S. Environmental Protection Agency, Central Docket Section, Room WSM-2903B, 401 M Street, SW, Washington, DC. The Docket may be inspected between 8 a.m. and 4 p.m. on weekdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: James M. Hardin, Office of Radiation Programs (ANR-460), U.S. Environmental Protection Agency, Washington, D.C. 20460, telephone (703) 557-8610.

SUPPLEMENTARY INFORMATION: Section 122 of the Clean Air Act as amended in 1977 directs the Administrator of the Environmental Protection Agency, after notice and opportunity for public hearing, to review all relevant information and determine whether emissions of radioactive pollutants will cause or contribute to air pollution which may endanger public health. Therefore, the Agency published a notice which called for relevant information and data on radioactive air pollutants and offered to hold a public hearing (44 FR 11707; April 11, 1979). All written comments received were considered in today's decision. Copies of these comments are to be found in the Agency's Central Docket No. A-79-11.

None of the commentors suggested that radioactive air pollutants do not endanger public health. Several commentors provided information on the release of specific radionuclides into the atmosphere. One commentor requested that the comment period remain open until completion of the third report of the National Academy of Sciences' Advisory Committee on the Biological Effects of Ionizing Radiation (BEIR). We do not believe such a delay is appropriate because the BEIR III Report is unlikely to change substantially the conclusions of the first (1972) BEIR Report regarding the carcinogenic effects of radionuclides. We have received a summary of the BEIR III Report which supports this opinion. If the report is completed as scheduled, we will consider its findings in formulating any proposed standards. Public hearings will be held when standards are proposed and comments on the BEIR III Report, if it is used in formulating the standards, will be welcomed at that time.

One commentor requested that the Agency hold a hearing after we make a preliminary determination and decide on our legal, scientific, and economic positions so that informed public comment is possible on these issues before the final determination is made. We do not believe that such a public hearing is either required or useful. The intent of Section 122 is to insure that the Agency has an opportunity to consider any information not previously considered, or to call specific attention to particular information on the emissions of, and health effects from, air pollutants that may be hazardous. In EPA's view, Section 122 does not require what would essentially be a proposed listing notice and hearing. This view is based on the language and history of Section 122 and on the fact that a full hearing on those topics will be available after proposal of standards under Section 112.

Section 112 of the Act directs the Administrator to publish and from time-to-time to revise a list of air pollutants which, in his judgment, probably causes, or contributes to, an increase in mortality or serious illness and to which no national ambient air quality standard applies. Within 180 days after the inclusion of any air pollutant in the list, the Administrator must publish proposed regulations establishing emission standards for such a pollutant, together with a notice of a public hearing to be held within 30 days.

In accordance with the requirements of Sections 122 and 112, the Agency finds that studies of the biological effects of ionizing radiation indicate that exposure to radionuclides increases the risk of human cancer and genetic damage. Also, the Agency finds that emission data indicate that radionuclides are released into air from many different natural and man-made sources with the result that everyone is exposed to them. Further information on these findings is given in Appendix I (biological effects) and Appendix II (emission data) of this notice.

Based on this information, the Administrator has concluded that emission of radionuclides may reasonably be anticipated to endanger public health, and that radionuclides constitute hazardous air pollutants within the meaning of the Clean Air Act. In making this determination, the Administrator has consulted with the Nuclear Regulatory Commission (NRC) as required by Section 122. Among the radionuclides included are those defined by the Atomic Energy Act as source material, special nuclear material, and byproduct material.

In accordance with Section 112(b)(1)(A) the Administrator hereby amends the list of hazardous air pollutants:

List of Hazardous Air Pollutants

* * * * *

6. Radionuclides

Dated: November 6, 1979.

Douglas M. Costle,
Administrator.

Appendix I—Summary of Evidence That Radionuclides are Carcinogenic and Mutagenic to Humans

A. *EPA's Current View.* An extensive body of research has demonstrated that carcinogenicity and mutagenicity are associated with ionizing radiation and, therefore, with exposure to radionuclides. Exposure to enough ionizing radiation increases the risk of most forms of cancer, including leukemia, lymphoma, and cancers of the lung, bone, thyroid, breast, skin, stomach, pancreas, esophagus, pharynx, large intestines, and others. When germ cells of the ovary or testis are exposed to enough radiation, the risk of mutagenesis is increased which, in turn, may cause increased mortality and illness in future generations. For very low doses there is no conclusive evidence of the risk involved.

The relationships between specific radiation doses and risks to health are extremely complex. They depend on physical parameters, such as the energy and type of radiation (e.g., alpha, beta, or gamma radiation), total dose, dose distribution within the body, and dose rate. In addition, many biological factors, such as the specific organ exposed, the radiosensitivity of the individual exposed, errors that occur in biological repair mechanisms, sex, race, age at time of exposure, genetic composition, and state of health, may influence the effects of radiation. These factors involve complex mechanisms of interaction among biological, chemical, and physical systems, which are further complicated because people are also exposed to other factors such as tobacco smoke and industrial chemicals, which may change the magnitude of radiation effects.

Although there is no conclusive evidence of the effects of very low doses of radiation on human populations, the Agency assumes that the effects of low doses of radiation are proportional to the dose received in estimating the health impact of possible low-level radiation protection standards. We believe this assumption is reasonable and prudent in the light of presently available evidence (1).

The information used by the Agency in formulating these estimates of the biological effects of radiation exposure and the relationships between radiation dose and the effects on public health has been summarized in publications by the National Academy of Sciences (NAS) (2), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) (3), and the International Commission on Radiological Protection (ICRP) (4). These bodies agree that high levels of radiation cause cancer and mutations and that a sensible regulatory approach is to consider risk to be proportional to radiation dose at all low doses.

B. *The Basis of EPA's View.* The first human cancer attributed to external ionizing radiation was reported in 1902 from X-ray exposures (5). By 1911, 94 cases of radiation-related skin cancer and five cases of leukemia in man had been reported in the literature (6). Studies from 1910 to 1912 produced the first reports of radiation induced cancers in experimental animals (7, 8). In 1921, the first association between inhaled radionuclides and carcinogenesis in humans was made by Uhlig for radon exposure and lung cancer in underground miners in the Erz Mountains of Austria, and Czechoslovakia (9). This association was reaffirmed by Ludewig and Lorenser in 1924 (10). Swallowing radium was shown to cause bone necrosis (11), and in 1929, Martland and Humphries reported the association of swallowed radium and osteosarcoma in occupationally exposed workers (12).

In more recent times, several studies of human populations have conclusively shown that sufficient exposure to radiation increases the risk of many different kinds of cancer. Among the most significant of these are the following:

a. Survivors of the atomic bomb explosions at Hiroshima and Nagasaki, Japan (13).

b. Two large groups of medical patients given X-ray therapy or injections of radium-224 for ankylosing spondylitis of the spine (3).

c. Groups of women whose breasts were exposed to X-rays during diagnostic radiation of the thorax or during radiotherapy for benign conditions (3).

d. Patients medically treated with X-rays, mostly to the head and neck, for the alleviation of otherwise benign conditions (3).

e. Underground miners exposed to elevated levels of radon (3).

f. Persons who ingested radium-226 either for medical purposes or in the course of their occupations (2,3).

g. Patients injected with thorotrast (colloidal thorium dioxide) as an x-ray contrast medium (14,15).

h. Children exposed *in utero* to diagnostic x-rays (2,3).

Extensive studies in experimental animals, especially rodents, and studies of cell cultures support the idea that ionizing radiation can cause mutations. Animal studies have shown that ionizing radiation can cause many types of mutations: lethal mutations, translocations, inversions, nondisjunction, and point mutations (2,3). Extrapolations of mutation rates calculated in these studies form the basis for estimating the genetic (hereditary) impact of ionizing radiation in humans (2,3).

Although genetic damage to the children of irradiated persons has not been identified, chromosome aberrations in somatic cells have been observed in persons exposed to ingested strontium-90 and radium-226 (16), inhaled/ingested radon-222 (17), inhaled/ingested plutonium-239 (17), inhaled radon-222 (18), and also in lymphocytes from atomic bomb survivors (19) and shipyard workers at nuclear facilities in England (20).

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2. Advisory Committee on the Biological Effects of Ionizing Radiations. *The Effects on Populations of Exposure to Low Levels of Ionizing Radiation.* National Academy of Sciences, Washington, D.C. (1972).

3. United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). *Sources and Effects of Ionizing Radiation.* United Nations, New York (1977).

4. International Commission on Radiological Protection. Publication 26, Radiation Protection, Pergamon Press, New York (1977).

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Appendix II—Summary of Evidence of Significant Public Exposure to Radionuclides Because of Emissions Into the Atmosphere

Most of the radionuclides in the atmosphere come from natural sources (1). However, radionuclides are used or produced in thousands of locations throughout the United States including national defense weaponry facilities, nuclear power plants, industrial plants, research and development laboratories, and medical facilities. Fossil fuel combustion processes, such as large coal-fire boilers, make some contribution to the exposure of the general public. Certain kinds of mining and milling also substantially increase the local concentration of radionuclides in the air.

Although air cleaning equipment is usually used in these facilities, some radionuclides are still released into the atmoshphere and can disperse into populated areas. In most cases the greatest danger comes from breathing these radionuclides, but material which settles on soil or plants may eventually be swallowed. Settled material may also be blown back into the air. People living near some facilities may also be exposed to small levels of direct gamma radiation from airborne or settled radionuclides.

EPA has recently published a preliminary evaluation of the harm caused by emissions of radionuclides into air in the United States (2). The document contains a complilation of the amount of radionuclides released into the atmosphere from each major category of facility known to use such materials. It estimates both the radiation dose to the nearest individual and to the regional population. Using these doses, we have estimated the additional lifetime fatal cancer risk to individuals and the total number of fatal cancers induced in the surrounding population for each year of facility operation. Risk estimates are limited to fatal cancers because we have less confidence in quantitative risk estimates of genetic effects in humans. Our current practice is to assume that for whold body exposure, the number of genetic health effects, and the number of nonfatal cancers are each about the same as the number of deaths (3).

Sources can be conveniently divided into three major groups: facilities licensed by NRC and certain States which have signed an agreement with NRC; facilities operated and regulated by the Department of Energy (DOE); and facilities emitting elevated concentrations of naturally-occurring radionuclides. The kinds of radionuclide emissions, estimates of dose rates, and estimates of fatal cancer risks derived from model facilities which are representative of source categories are shown in Tables 1 and 2. Table 3 shows data derived from actual DOE facilities.

These summary tables show that significant amounts of radionuclides are being released by man into the atmosphere. Such estimates shoulld be used carefuly and with recognition that they are highly uncertain. This uncertainty is caused by limited data on emissions and by the use of assumptions in environmental transport models and in dose models. Based on these calculations, the highest estimated doses received are to people near elemental phosphorus plants. Our preliminary dose estimates for such people give 1800 mrem/yr to the kidney, 740 mrem/yr to the lung, and 570 mrem/yr to the bone. People living near underground uranium mines may be exposed to elevated airborne concentrations of radon daughters as high as 0.006 working levels. (WL).

We estimate that even the individuals who live closest to the facilities listed in Tables 1, 2, and 3 receive doses which are less than the present applicable Federal Guidance as established by the former Federal Radiation Council (4,5). However, EPA considers the potential risk from doses as large as those received from many of these facilities to be unnecessarily high. We believe that emissions from such facilities should be reduced to as low as reasonably achievable levels. In specific cases, EPA has already promulgated standards and proposed Federal Guidance which holds the exposure of people to levels below that found around many of the listed source categories. These actions include: Drinking Water Regulations (Radionuclides) (6), Environmental Radiation Protection Standards for Nuclear Power Operations (7), and proposed Federal Guidance for Persons Exposed to Transuranium Elements in the Environment (8).

EPA considers its current estimates of risk to be sufficiently accurate to support the decision to list radionuclides as hazardous air pollutants. However, we will continue to improve our preliminary estimates of how much cancer is caused by facilities which release radionuclides into the air.

As provided in EPA's recently published proposed rules for regulating airborne carcinogens (44 F.R. 58642–58670; October 10, 1979), EPA will base all decisions on setting standards for radionuclide emissions on detailed risk assessments and complete regulatory options analyses considering the following factors: a detailed examination of sources of emissions of radionuclides into air, the risks caused by these emissions, the costs and effectiveness of emission control technologies, the benefits of the activities causing the emissions, the relationships between who is receiving the benefits versus who is required to accept the risks, and the possibility of using substitutes to reduce emissions. EPA will request public comment before making standard-setting decisions.

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Table 1

Summary of radiological impact caused by atmospheric emissions from licensed[a] sources

Source category	Number of sources	Model facility: Principal radionuclide emissions (Ci/y)		Principal dose equivalent rates: Maximum individual (mrem/y)[b]		Principal dose equivalent rates: Regional Population (Person-rem/y)[c]	Lifetime risk to the maximum individual (x 10^{-6})	Expected fatal cancers per year of operation: Regional population (Fatal cancers)
Uranium conversion facilities	2	U-238 U-234 Th-234	0.08 0.08 0.08	Lung Bone	88 9	120 5	300	0.007
Fuel fabrication facility	16	U-234 U-23 U-236 U-238 Th-231 Th-234	0.008 0.0003 0.0004 0.001 0.0003 0.001	Lung Bone	5 0.5	7 0.3	20	0.0004
Light water reactors Boiling water reactors	25	Noble gases Tritium Halogens	7,000 43 1.4	Thyroid Whole body	11 2	19 8	20	[d]0.001
Pressurized water reactors	44	Noble gases Tritium Halogens	13,000 1,100 0.05	Thyroid Whole body	1 0.8	7 5	9	[d]0.001
High temperature gas cooled reactor (Fort St. Vrain)	1	Noble gases	1,100	Whole body	0.5	6	6	0.001
Radiopharmaceutical industry Producers	34	I-125 I-131	0.9 0.9	Thyroid Whole body	86 0.2	200 0.7	8	0.0003

See footnotes at end of table.

Table 1--continued

Summary of radiological impact caused by atmospheric emissions from licensed[a] sources

Source category	Model facility							
	Number of sources	Principal radionuclide emissions (Ci/y)		Principal dose equivalent rates			Lifetime risk to the maximum individual (x 10^{-6})	Expected fatal cancers per year of operation
					Maximum individual (mrem/y)[b]	Regional Population (Person-rem/y)[c]		Regional population (Fatal cancers)
Test reactors	2	Ar-41 Tritium	450 150	Whole body	0.2	1	2	0.0002
Research reactors	13	Ar-41 Tritium	200 100	Whole body	0.09	0.5	1	0.00008
University reactors	54	Ar-41 Tritium	1,000 100	Whole body	0.4	2	5	0.0004
Shallow land burial Low level waste	6	Tritium	19,000	Bone Whole body	30 20	6 5	90	0.0008
Industrial users	4,000	Mostly sealed	No data					

[a] Sources licensed by the Nuclear Regulatory Commission (NRC) or States which have entered into an agreement with the NRC whereby certain regulatory authority is relinquished by the NRC and assumed by the States pursuant to Section 274 of the Atomic Energy Act of 1954, as amended.

[b] The maximum dose equivalent rate an individual is likely to receive living near the facility.

[c] The maximum collective dose equivalent rate to the regional population. This is the maximum value expected to occur within 100 years following the start of facility operation.

[d] The number of fatal cancers to the worldwide population has been estimated to be 0.04 from BWRs and 0.02 from PWRs per year (2).

Table 2

Summary of radiological impact caused by atmospheric emissions of natural radioactive materials

		Model facility									
		Principal radionuclide emissions (Ci/y)[a]		Exposure levels		Principal dose equivalent rates			Lifetime risk to the maximum individual (x 10-6)	Expected fatal cancers per year of operation	
				Maximum individual (WL)	Regional Population (Person-WL)		Maximum Individual (mrem/y)[b]	Regional Population (Person-rem/y)[c]		Population Regional (Fatal cancers)	U.S.
Source category	**Number of sources**										
Uranium Mines Underground	251	Rn-222	6800	0.006	1.3		-	-	10,000	0.03	0.08
Open pit	36	Rn-222	2000	0.00084	0.38		-	-	1,000	0.008	0.02
Uranium Mills	21	Rn-222 U-238+d	2700 0.4	0.0049	0.54	Lung Bone	350 360	3.4 3.9	10,000	0.01	0.03
Phosphate Industry Mining and beneficiation	35	Rn-222	1300	0.00022	4.9		-	-	300	0.1	
Drying and grinding facilities	20	Rn-222 U-238+d	20 0.03	0.00005	0.084	Lung Bone	54 79	17 18	500	0.004	
Phosphoric acid plant	35	Rn-222 U-238+d	480 0.1	0.00066	2.0	Lung Bone	85 110	46 45	2,000	0.05	
Elemental phosphorus plant	9	Rn-222 U-238+d Po-210	490 0.07 7.4	0.00035	2.0	Lung Bone Kidney	740 570 1800	770 440 1400	6,000	0.1	
Coal-fired power stations[d] Urban site	395	Rn-222 U-238+d Th-232+d	1.9 0.25 0.07	0.00001	0.024	Lung Bone	0.88 1.6	2600 1300	10	0.2	
Suburban site		Rn-222 U-238+d Th-232+d	1.9 0.25 0.07	0.00001	0.002	Lung Bone	1.1 2.1	190 160	10	0.02	
Rural site		Rn-222 U-238+d Th-232+d	1.9 0.25 0.07	0.00001	0.0005	Lung Bone	2.1 16.0	51 50	60	0.005	
Remote site		Rn-222 U-238+d Th-232+d	1.9 0.25 0.07	0.00001	0.00001	Lung Bone	0.79 2.1	0.5 1.5	10	0.00008	

See footnotes at end of table.

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Table 2--continued

Summary of radiological impact caused by atmospheric emissions of natural radioactive materials

Source category	Number of sources	Model facility								
		Principal radionuclide emissions (Ci/y)[a]		Exposure levels		Principal dose equivalent rates		Lifetime risk to the maximum individual ($x 10^{-6}$)	Expected fatal cancers per year of operation	
				Maximum individual (WL)	Regional Population (Person-WL)	Maximum Individual (mrem/y)[b]	Regional Population (Person-rem/y)[c]		Population	
									Regional	U.S. (Fatal cancers)
Metal mining and milling[e]	177	Rn-222	30 to 3000	< 0.00001 to 0.0006	0.005 to 0.8	-	-	20 to 900	0.0001 to 0.02	
Nonmetal mining and milling[f]	4,200	Rn-222	0.2 to 18	< 0.00001 to 0.00004	0.0007 to 0.06	-	-	0.7 to 50	0.00002 to 0.001	
Underground drinking water treatment plants	40,000	Rn-222	3.4	< 0.00001	0.06	-	-	10	0.001	

[a] U-238+d includes daughter products of uranium-234, thorium-230, radium-226, polonium-210, and lead-210 except for elemental phosphorus plants when polonium-210 is not included among the uranium-238 daughter products. Thorium-232+d includes the daughter products of radium-228, thorium-228, and radium-224.

[b] The maximum dose equivalent rate an individual is likely to receive living near the facility.

[c] The maximum collective dose equivalent rate to the regional population. This is the maximum value expected to occur within 100 years following the start of facility operation.

[d] The emission rates presented for the source category are based on a model representative of new plants releasing one percent of the fly ash.

[e] Includes iron, copper, zinc, and bauxite.

[f] Includes clay, limestone, fluorspar.

Table 3

Summary of radiological impact caused by atmospheric emissions from Department of Energy facilities

Facility	Number of facilities	Principal radionuclide emissions (Ci/y)		Principal dose equivalent rates[a]			Lifetime risk to the maximum individual ($x\ 10^{-6}$)		Expected fatal cancers per year of operation
				Maximum individual (mrem/y)		Regional Population (Person-rem/y)			Regional population (Fatal cancers)
Savannah River Plant[b]	1	Ar-41 C-14 Tritium Kr-85	65,000 63 360,000 440,000	Total body	1.1	110	Site boundary	20	0.02
Los Alamos Scientific Laboratory	1	Ar-41 C-11 Tritium N-13 O-15	800 14,000 39,000 1,400 32,000	Total body	70	11	Site boundary Nearest resident	1,000 300	0.002
Lawrence Livermore Laboratory	1	Ar-41 Tritium N-13 O-15	380 5,200 590 390	Total body	4.3	2.9	Site boundary Nearest resident	60 10	0.0006
Rocky Flats Plant	1	Pu-239 & Pu-240 U-235 U-238	0.000004 0.00002 0.00002	Lung Bone Kidney Liver	0.08 0.035 0.004 0.005	130 58 7 9	Site boundary	0.3	0.007
Argonne National Laboratory	1	Ar-41 Tritium	30,000 850	Total body	5.6	180	Site boundary Nearest resident	80 40	0.04
Brookhaven National Laboratory	1	Ar-41 Tritium O-15	360 1,200 67,000	Total body	0.16	19	Site boundary	2	0.004

See footnotes at end of table.

Table 3--continued

Summary of radiological impact caused by atmospheric emissions from Department of Energy facilities--continued

Facility	Number of facilities	Principal radionuclide emissions (Ci/y)		Principal dose equivalent rates[a] Maximum individual (mrem/y)	Principal dose equivalent rates[a] Regional Population (Person-rem/y)	Lifetime risk to the maximum individual (x 10^{-6})		Expected fatal cancers per year of operation Regional population (Fatal cancers)
Oak Ridge Facilities[c]	1	U-234 I-131 Kr-85	0.06 1.4 8,600	Lung 4.6 Bone 5.5 Thyroid 1.5	Total body 4.7	Nearest resident	10	0.001
Portsmouth Gaseous Diffusion Plant[c]	1	Th-234 U-234 Tc-99	0.05 0.1 4.5	Lung 1.1 Bone 1.2 Kidney 1.1 G. I. Tract 2.2	Total body 0.19	Site boundary	10	0.00004
Paducah Gaseous Diffusion Plant[c]	1	U-234 U-238	0.2 0.2	Lung 6.3 Bone 0.9	NR	Site boundary	20	NR
Ames Laboratory	1	Ar-41 Tritium	13,000 1,000	Total body 5.5	250	Site boundary	80	0.05
Other sites	17	Various	Small	Total body<1	Total body <10	Site boundary	<10	< 0.002

[a] Data taken directly from DOE reports.
[b] All doses are 70-year dose commitments.
[c] All doses are 50-year dose commitments.
NR Not reported.

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